BUREAU OF FISHERIES

REPORT OF

THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR 1909

AND

SPECIAL PAPERS

GEORGE M. BOWERS
Commissioner

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REPORT OF THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR ENDED JUNE 30, 1909

Bureau of Fisheries Document No. 727

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REPORT

OF THE

COMMISSIONER OF FISHERIES.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF FISHERIES,
Washington, December 6, 1909.

SIR: I have the honor to submit herewith a report of the operations of the Bureau of Fisheries for the fiscal year ended June 30, 1909.

PROPAGATION OF FOOD FISHES.

EXTENT OF THE WORK.

In its important work of stocking the public waters with food fishes, and of furnishing food and game fishes for private streams, lakes, and ponds, the Bureau has followed established methods that have had for their main object the largest results at the minimum cost. The magnitude of the operations necessitates close scrutiny of the details of the expenditures, and it is noteworthy that in the fiscal year 1909 the volume of the fish-cultural work was much larger than ever before, while the available appropriations were not increased. In other words, notwithstanding that labor and materials cost more than formerly, the Government has expended less money in order to produce and plant a definite number of food fishes. This result has been achieved by greater efficiency and zeal on the part of employees and by extension of the fields of operation.

The fish hatcheries operated in 1909 numbered 35 and the subhatcheries, auxiliaries, and egg-collecting stations numbered 84; these were located in 32 States and Territories. The regular hatcheries may be classified as follows with reference to the fisheries propagated: Marine species, 3; river fishes of eastern seaboard, 5; fishes of the Pacific coast, 5; fishes of the Great Lakes, 7; fishes of the interior regions, 15.

In the following table the output of the hatcheries is summarized by species. From the aggregate figures given it will be seen that a new record has been made in the Bureau's fish-cultural work, the total output of 3,107,131,911 fish and eggs being 235,675,000 more than in 1908, the best previous year.

SUMMARY OF DISTRIBUTIONS OF FISH AND EGGS, FISCAL YEAR ENDED JUNE 30, 1909.

Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Total.
Catfish			562,580	562,580
Carp			7,807	7,807
Buffalofish			57,400	57,400
Shad	266,000	57,112,000		57,378,000
Whitefish	142,220,000	277,445,000		419,665,000
Chinook salmon	38,859,265	20,177,286	75,429	59,111,980
Silver salmon	272,000	9,470,925		9,742,925
Blueback salmon	100,000	93,409,496		93,509,496
Humpback salmon		10,000	100	10,100
Steelhead trout	271,468	2,181,413	46,500	2,499,381
Rainbow trout	286,150	292,408	2,026,463	2,605,021
Atlantic salmon		647,790	24,435	672,225
Landlocked salmon	570,000	793,550	237,896	1,601,446
Blackspotted trout	602,820	5,993,943	2,049,395	8,646,158
Loch Leven trout			70,000	70,000
Lake trout	22,806,000	27,188,177	1,345,100	51,339,277
Brook trout	905,000	5,821,322	3,723,489	10,449,811
Sunapee trout		229,736		229,736
Scotch sea trout			47	47
Grayling	350,000	808,000	6,032	1,164,032
Pike			44,200	44,200
Crappie and strawberry bass		62,500	217,355	279,855
Rock bass			51,112	51,112
Warmouth bass			2,278	2,278
Smallmouth black bass		262,674	111,924	374,598
Largemouth black bass		32,500	540,962	573,462
Sunfish			317,888	317,888
Pike perch	457,850,000	187,050,000		644,900,000
Yellow perch	10,000,000	213,610,410	50,873	223,661,283
Striped bass		4,518,000		4,518,000
White perch	24,500,000	318,760,000	2,650	343,262,650
Yellow bass		136,938	1,225	138,163
Smelt	24,700,000	9,400,000		34,100,000
Freshwater drum			25,000	25,000
Cod		153,536,000		153,536,000
Flatfish		786,626,000		786,626,000
Pollock		30,890,000		30,890,000
Lobster		164,509,000		164,509,000
Total	724,558,703	2,370,975,068	11,598,140	3,107,131,911

One of the most noteworthy aspects of the fish-cultural work is the increased interest in the utilization of private or semiprivate waters for rearing food and game fishes. This interest appears in all parts of the country and among all kinds of people and is evidenced by the demands made on the Bureau for desirable fishes for stocking purposes. During the year applications were received for fish for planting in 10,112 different bodies of water, an increase of 25 per cent over 1908 and of more than 400 per cent over 1900.

REVIEW OF OPERATIONS.

In considering the results of the fish-cultural work it should be borne in mind that the conditions which determine success or failure often depend largely on physical and meteorological factors operative during the comparatively short spawning season for the different species. Storms, freshets, drought, abnormal heat and cold, and other natural agencies may render abortive the most thorough preparations and most active efforts at particular stations. The most serious drawbacks, however, are the artificial conditions—dams, lines of nets,

etc.—that prevent the spawning fish from reaching their spawning grounds in adequate numbers.

There was a further marked decrease in the collection of shad eggs and in the resulting output of fry. The lack of success at the stations on the Potomac and Susquehanna rivers can be accounted for only by the absence of protective measures that would insure the arrival of a fair percentage of the migrating fish at the spawning grounds. In sharp contrast to the results in Maryland and Virgina was the record at the North Carolina shad hatchery on Albemarle Sound, where the egg collections were larger than in any previous year except 1901. This outcome is clearly attributable to the workings of the recent law that regulates fishing in the interests of conservation.

The hatching of white perch for the Chesapeake basin was somewhat more extensive than in 1908, while the yellow-perch work in the same region showed a falling off owing to the failure to obtain eggs from the first run of fish on the Susquehanna River, where the season opened much earlier than was expected.

The artificial propagation of the Atlantic salmon at the station near the Penobscot River in Maine was much less successful than formerly. The conditions in this stream are most unfavorable for fish and fish culture, and it is not improbable that the long-continued efforts of the Bureau to maintain the run of salmon in the only remaining salmon stream on our Atlantic coast will prove unavailing.

Very boisterous and wintry weather during November interfered with the daily trips of the Bureau's vessels to the cod-fishing grounds and often prevented the launching of dories containing spawntakers, with the result that the cod operations fell off about 40 per cent as compared with 1908. The Norwegian method of obtaining eggs from brood cod was followed at the Woods Hole (Massachusetts) station on the same scale and with the same success as heretofore. The unprecedentedly large production of winter flounder, or flatfish, was chiefly due to the inauguration of the cultivation of this species at the Boothbay Harbor (Maine) station. The combined output of lobster fry at the three marine stations was about 10 per cent smaller than in the previous year, while the hatching of pollock at the Gloucester (Massachusetts) station was much less extensive.

The output of whitefish, while less than in 1908, was fairly satisfactory. Egg collecting in the Detroit River, one of the most productive fields, was seriously interfered with by extensive government improvements which necessitated much blasting. The take of eggs at the western end of Lake Erie was larger than ever before, and it is thought that the unusual success in this field may have been due to the capture there of fish that under ordinary conditions would have spawned in the Detroit River.

The output of lake trout and pike perch was larger than ever before. An important factor in the collection of lake-trout eggs was the cooperation of fishermen operating gasoline boats, who took the eggs and delivered them free of charge to the Bureau's agents. Favorable weather and the active cooperation of Pennsylvania and Ohio conduced to the unusually large output of pike perch.

The drought seriously affected the collection of salmon eggs in the Pacific States. The run of chinook salmon in the Sacramento River appeared to be as large as usual, and the catch of fish for commercial purposes was good, but owing to low water the fish could not reach their accustomed spawning grounds in the McCloud River and in consequence deposited their eggs below the plāce where the Bureau had constructed racks for their interception. When the heavy rains finally came, the rack in the McCloud was broken, and three men who were working on the rack throughout the night to keep it free from leaves and other débris were thrown into the raging torrent and miraculously saved from drowning. It is estimated that the fish that had congregated below the rack would have yielded 8,000,000 eggs. The output of chinook salmon was much less than in 1908, as was also that of silver salmon and humpback salmon; but a record was established for the blueback, sockeye, or red salmon, owing to the successful opening of the new hatchery at Afognak (Alaska), whose initial output was over 39,000,000 fish. An experiment with the sockeye which may lead to an important outcome was made on Puget Sound. Five hundred fish caught in traps at Point Roberts and donated to the Bureau by one of the fishing companies were towed in a live-car to an adjacent creek and held for the ripening of their eggs. Sufficient eggs were collected to warrant the belief that it will be possible to propagate large numbers of this most valuable species by impounding in fresh water salmon caught in the commercial fishing.

With regard to the cultivation of the fishes of the interior waters, it may be noted that the season showed a marked increase in the output of catfish, blackspotted trout, and landlocked salmon, the work with the last-named species establishing a record as a result of improved methods at Grand Lake Stream. The production of brook trout from the eggs of wild fish fell off in both New England and Colorado as the result of drought, and, as in previous years, the demands for this fish could be met only by the purchase of large numbers of eggs from private hatcheries. There were no material changes in the distribution of the various other fishes that are regularly handled.

Species whose cultivation was undertaken for the first time in 1909 are the smelt, the white bass, and the yellow bass. The smelt (*Osmerus mordax*) is one of the most popular food fishes of the

New England States, in coast waters, in streams, and in lakes. Preliminary cultural operations in connection with the Green Lake (Maine) station resulted in the collection of 35,610,000 eggs, and from the experience gained it is apparent that artificial propagation may be conducted on a large scale and that the eggs may safely be shipped for long distances. Besides its excellent edible qualities, the smelt is valuable for planting in lakes containing trout and landlocked salmon as a food for those fishes. Experiments in the propagation of the white bass (*Roccus chrysops*) have begun at the Mammoth Spring (Arkansas) station, and the indications are that work on an extensive scale is possible. The yellow bass (*Morone interrupta*) has been successfully handled at the same station, where it has been demonstrated that the fish will reproduce naturally in artificial ponds, and also that the eggs may be taken and fertilized artificially; the incubatory period is five days in a water temperature of 59° F.

The important work of rescuing fishes from the sloughs formed by the overflows of the Mississippi and Illinois rivers has been conducted under favorable conditions. Large numbers of valuable food fishes have been restored to the rivers, and many of the younger fish have been utilized for stocking public and private ponds and streams throughout the country. Operations of a similar nature were undertaken on the Chesapeake and Ohio Canal in the fall of 1908, on the occasion of the annual emptying of the canal. As the water falls the fish that have entered the canal from the river collect in the deeper places, where they would eventually be destroyed; and to these points the Bureau sent seining crews, which collected the fish and transferred them to the adjacent parts of the Potomac. About 75 miles of the canal were thus covered, and 47,674 food fishes, consisting mostly of black bass, crappie, sunfish, rock bass, warmouth bass, catfish, and suckers, were saved. The work, however, was less successful than was anticipated, for the reason that persons living along the line of the canal were permitted to seine on some of the best grounds before the Bureau's men arrived.

CONSTRUCTIONS AND IMPROVEMENTS AT HATCHERIES.

The facilities for lobster culture at the Boothbay Harbor (Maine) station have been greatly increased by the purchase of a site near Pemaquid Harbor and the construction thereon of a lobster pound, in which egg-bearing lobsters may be safely kept pending the hatching season. This will permit the Bureau to collect seed lobsters as opportunity is afforded throughout the year and hold them in large numbers instead of having to depend, as heretofore, on possible collections from fishermen immediately before the hatching season. A noteworthy increase in the output of the station should result from this

improvement. At the hatchery the buildings have been put in good condition, and a substantial coal wharf has been built.

The work at the Green Lake (Maine) station has in the past been seriously interfered with by a lack of convenient means of communication. The station has heretofore been reached only by expensive, unreliable, and generally unsatisfactory boat service. To obviate this difficulty, the construction of a road from the hatchery to the public highway was undertaken and is now well advanced to completion.

Owing to an insufficient water supply at the St. Johnsbury (Vermont) station, trout culture at that place has been restricted. Property at Holden, Vt., has been acquired for the purpose of establishing a trout hatchery to be operated as an auxiliary of the St. Johnsbury station. The tract comprises about 24 acres and appears to have all the requisite conditions.

At the Erwin (Tennessee) station 14.8 acres of land have been purchased in order to straighten the boundary line and eliminate certain objectionable features which impaired the usefulness of the station; and at the Cold Springs (Georgia) station 60,000 square feet of adjoining land, containing a dwelling, have been purchased to meet the growing needs of the hatchery.

The water supply at the Neosho (Missouri) station has been falling off for a number of years, and the operations have been curtailed in consequence. To rectify this a new source of supply was acquired, and a pipe line 12 inches in diameter and 11,800 feet long has been laid to connect it with the station. It is believed that a marked increase in the efficiency of the station will ensue.

The basement of the hatchery at Duluth, Minn., has been enlarged, raised, and equipped with new troughs, so that the capacity of the plant is nearly doubled. The flume and intake crib have been reconstructed and improved.

The pond system at the Mammoth Spring (Arkansas) station has been extensively enlarged and improved. At the Bozeman (Montana), Leadville (Colorado), Manchester (Iowa), White Sulphur Springs (West Virginia), and Wytheville (Virginia) hatcheries only minor expenditures were made from special appropriations, chiefly for repairs to buildings and improvements to water-supply systems.

It was expected that the salmon hatchery at Afognak, Alaska, would be completed during the year, but owing to the rigors of the climate, the difficulties in the way of transporting supplies and materials, and the lack of efficient help, the construction stage is not yet passed, although the hatching of fish has begun. Gratifying progress has been made in building, racks have been put in, a heating plant has been installed, and the work of finishing the hatchery, residence, mess house, quarters, tramway, roads, etc., is proceeding as expeditiously as possible.

At Yes Bay, Alaska, a telephone line has been run between the station and the boat landing, a distance of 17 miles, which will be of great assistance in operating the hatchery and has long been needed. A good foundation for racks, 8 feet wide and 250 feet long, has been made of heavy timbers, plank, rock, and gravel across the river at the lower end of the island.

FISH-CULTURAL RELATIONS WITH FOREIGN COUNTRIES.

For many years the Government of New Zealand has been introducing American fishes into waters originally deficient in desirable food and game fishes. The experiments have been addressed largely to the salmons, trouts, and whitefishes, and the Bureau has made many consignments of the eggs of these fishes to this distant colony. The results of the introduction of the rainbow trout were manifested at an early date, and it has long been known that New Zealand affords the best rainbow-trout fishing to be had anywhere in the world; over 40,000 pounds have been taken by anglers in one season from two small lakes, and the value of this species to the colony for sport and food is becoming greater each year. It is only recently, however, that the outcome of the transplanting of other important species has been seen. From information communicated by the fish commissioner of New Zealand, it appears that the blueback or sockeye salmon has become established in some streams, and that the chinook salmon, resulting from eggs sent from the Bureau's McCloud River station in 1901 and subsequent years, appeared in certain rivers in considerable numbers in 1908 and 1909, and has already become the subject of artificial propagation, 238,000 eggs being collected in 1909.

Dr. Gregory Antipa, inspector-general of fisheries in Roumania, has notified the Bureau of the desire of the Roumanian Government to present to the United States lots of young sturgeon from the Black Sea and Danube, with a view to their cultivation and the ultimate stocking of suitable east-coast rivers therewith. The condition of the sturgeon supply in all parts of the United States is most unsatisfactory, and the commercial extinction of the sturgeon in most streams is only a matter of a short time unless radical protective measures are taken by the various States. The efforts of the Bureau to propagate the native sturgeon on several of the leading rivers have been unfruitful, owing to inability to collect the eggs. The importation of new species is therefore well worthy of a trial. Several of the Roumanian sturgeons are most desirable for their flesh and eggs, and their successful introduction to our waters would prove a great boon.

In response to requests reaching the Bureau through the Department of State, fish ova to the number of 568,150 have been donated to foreign countries, as follows:

Country and species.	Number.	Country and species.	Number.
Argentina:		France:	
Blueback salmon	100,000	Brook trout	10,000
Brook trout	50,000	Lake trout	10,000
Chinook salmon	200,000	Germany:	
Lake trout	50,000	Rainbow trout	16,150
Landlocked salmon	15,000		
Rainbow trout	25,000	Total	568,150
Silver salmon	92,000		

Through the courtesy of the Canadian fishery authorities the Bureau, as heretofore, has maintained at Rossport, Ontario, as an adjunct of the Duluth (Minnesota) hatchery, a station for the collection of eggs of the lake trout.

BIOLOGICAL INQUIRIES AND EXPERIMENTS.

OYSTER INVESTIGATIONS AND SURVEYS.

The field work connected with the oyster-planting experiments in Louisiana was brought to a conclusion in January, 1909, and a full account of the results is in course of preparation for publication. As indicated in a previous report, the Bureau's efforts have met with an unusually prompt commercial response in Barataria Bay, which was totally unproductive of oysters when the work began, in January, 1906. At the end of the first year the experimental beds showed so clearly the feasibility and profitableness of oyster culture that in 1907 there were issued by the State 64 leases, covering 700 acres of barren bottom, and at present there are in force 77 leases, covering 906 acres. None of these private holdings became productive until 1908, but in that year there were shipped to market, from waters that previously had produced nothing, 97,090 bushels of oysters, valued at $59,748. These oysters were of high quality and were in steady demand in New Orleans, where oysters from the natural reefs could hardly be disposed of at one-fourth the price.

As an immediate result of this work, the State received during the year an income that exceeded the amount expended by the Bureau in all the experiments in this section. When the grounds at present under lease become fully productive, and especially when the other available bottom in the bay is acquired for planting purposes, the State's revenue from this source will be largely augmented and the income of the planters will be increased several times. It is gratifying to the Bureau that the zeal with which the people of Louisiana have acted on the information furnished by the Government has resulted in the establishment of a profitable industry among an industrious population of small means.

The experiments in St. Bernard Parish, especially in False-mouth Bay, were equally successful, and thousands of acres there have been shown to be suitable for oyster culture. Owing to the isolated situation of the region, however, the field is less favorable for small operators, and developments will probably be in the hands of persons financially able to take large leases.

Barataria and False-mouth bays alone, though producing nothing when the experiments were undertaken, are capable, if properly utilized, of yielding a quantity of oysters equal to the entire output of Louisiana at the present time.

The oyster-fattening experiments at Lynnhaven Bay, Virginia, have been more satisfactory than in the preceding year, but the quantity of oysters fattened was less than in 1907. The difficulties encountered in this work, which is both commercially important and unique, have been many, and it is evident that some of them are not yet overcome. Nothwithstanding the work of many investigators, both in this country and abroad, knowledge of the feeding conditions of oysters is very imperfect, and it is probable that the present experiments may have to await a more thorough understanding of underlying principles. The development of a certain and effective means whereby oysters can be fattened for the market is of highly practical importance to the oyster industry.

The Bureau has continued the cooperation with the Coast and Geodetic Survey and the Maryland Shellfish Commission in the survey of the oyster beds of Maryland, and the work should be practically completed during the fiscal year 1910. This oyster survey is the largest, most accurate, and most elaborate work of the kind ever undertaken.

In response to the request of the Virginia authorities, the Bureau at the end of the fiscal year entered on a survey of the natural oyster beds of the James River to determine accurately their present conditions and prospects. The location, condition, and administration of these beds has been a matter of controversy ever since the present boundary lines were established, and it is hoped that the work now underway will furnish data for such legislative and administrative action as may be necessary to secure their full value to the State and its citizens.

INVESTIGATION OF FRESH-WATER MUSSELS.

The extensive fishery and the important manufacturing interests dependent on the pearly fresh-water mussels of the Mississippi basin and other regions have induced the Bureau to undertake a comprehensive study of the biology of these mollusks and the physical characters of the waters they inhabit. The investigation is timely because of the serious depletion of the supply owing to the great demand for the shells for button making and to the indiscriminate waste

in hunting for pearls. The streams to which particular attention has been given with reference to the abundance and distribution of the useful mussels are the Mississippi in Iowa and Wisconsin, the Illinois, the Iowa, the Kentucky, the Maumee, the Minnesota, the Ohio, and the Wabash. In this work the Bureau has had the active cooperation of professors in the universities of Iowa, Minnesota, Missouri, and Vermont, and of other educational institutions, as well as persons associated in a practical way with the mussel fishery and pearl-button industry. Experiments in the artificial propagation of mussels have been continued, and a large number of fishes have been infected with larvæ of several species of mussels; through the courtesy of the university authorities this important work, begun in the field in autumn, was conducted during winter and spring in the laboratories of the University of Missouri.

Various available sites in the upper Mississippi basin have been examined with a view to locating the biological laboratory whose establishment was recently authorized by Congress. Among the places visited by representatives of the Bureau were Muscatine, Fairport, Davenport, Clinton, and Comanche, in Iowa; La Crosse, in Wisconsin; Winona and Homer, in Minnesota; Rock Island, in Illinois; and Terre Haute and Vincennes, in Indiana. After a careful consideration of the advantages and disadvantages offered by the different places, a location at Fairport, Iowa, was found to be the most suitable and it has accordingly been secured. The site comprises 60 acres of elevated land directly on the bank of the Mississippi. This station will be devoted to the study of all problems connected with the aquatic fauna of the Mississippi Valley, but it will be particularly concerned with the cultivation and preservation of the mussels in the interests of the pearl-button industry.

EXPERIMENTS IN SPONGE CULTURE.

The Bureau is gratified to announce the successful outcome of experiments in sponge culture in Florida, and will shortly make public a detailed account of the work that has extended over a series of years. The recent progress has been such as to warrant the Bureau in recommending sponge culture as a feasible commercial enterprise, and it is understood that a private company has already been organized to conduct sponge-cultural operations following the methods developed and made known by the Bureau. During the year, sponge cuttings grown at the experimental grounds in Cape Florida Channel have, at the end of twenty-nine months, attained an average weight of about 1.25 ounces, the maximum being nearly 2 ounces and the minimum about 0.75 ounce after perfect cleaning and thorough drying. The growth in Anclote Channel was approximately equal to this, but the cuttings at Soldier Key grew comparatively little. It is evident that factors of environment not yet fully understood have considerable influence on both the quality and the rate of growth of

the sponges; enough, however, is known to justify the belief that under proper state regulation and protection very important economic results must come from utilization of barren grounds for sponge planting, while at the same time the stability of the sponge crop will be assured.

STUDY OF FISH DISEASES.

The Bureau has continued to give attention to the diseases to which fish, particularly when under domestication, are liable, and during the past year has devoted special consideration to the occurrence of cancers and other tumorous growths. Tumors in fish have been known for many years, and the Bureau has from time to time collected specimens of various kinds of tumors from different species of fish. Owing to the activity that has characterized the investigation of cancer during the past ten years, cancer in the lower animals, and in fact in all the vertebrates, becomes a subject of great interest.

Certain types of cancer appear to be more frequent than others in domesticated fish; and cancer of the thyroid gland has been observed at various times in trout and salmon at government and other hatcheries. Of late the disease seems to be on the increase, and the Bureau has undertaken a thorough and systematic investigation of the entire subject of cancer in fish, and to this end has availed itself of the services of the director of the New York State Cancer Laboratory, who will pursue his studies in conjunction with the regular work of that institution. The Forest, Fish, and Game Commission of the State of New York also will cooperate in this work.

The inquiries already made have shown that the subject is very important and will require thorough study covering a considerable period of time. Careful investigation has been made in two localities where the disease is so prevalent as to constitute an epidemic; and the work will be extended so as to include a systematic examination of wild fish in open waters as well as the young and adult fish in government, state, and private hatcheries. At Buffalo, N. Y., where it is proposed to conduct experiments on fishes, arrangements have been made for the installation of two aquaria on the closed-circulation plan, with full provision for refrigeration and aeration of the water. The Bureau is fully alive to the far-reaching importance of this investigation, and will devote every energy and facility at its disposal for the prompt and thorough elucidation of the problems of the cause and prevention of this most serious malady.

OTHER INQUIRIES AND EXPERIMENTS.

It has long been a mooted question whether the steelhead trout and the rainbow trout are different species or the same species with somewhat different habits. A special study of these fish in their home waters has been undertaken. The evidence thus far obtained points to the specific identity of the fish. The question is not without

its practical bearing in fish culture, and the inquiry will soon permit a definite conclusion to be reached.

Studies of the physiology of the Pacific coast salmons have been continued. A field party spent the entire fishing season on the Columbia River, obtaining much information and collecting material for use in laboratory chemical analyses. In conjunction with this inquiry, a large amount of data was gathered relative to the catch of salmon in the wheel fishery.

The systematic examination of the interior waters of the country with reference to their biological and physical characters and to their present and prospective fish life has been continued. This season parties have had under investigation Sebago Lake and connecting waters in Maine, Lake Champlain in Vermont and New York, and certain small lakes in Wisconsin. The work in Wisconsin, as referred to in the report for last year, has been in cooperation with the State Geological and Natural History Survey, and has been addressed particularly to the oxygen content of the water at different depths and its relation to geographic and bathybial distribution of the lake trout, whitefish, cisco, muskallunge, and other fishes. The results already attained have an important bearing on the fish-cultural operations of the Bureau and of the various States.

Since the autumn of 1907 the steamer *Albatross* has been employed in conducting a survey of the fishing grounds and aquatic resources of the Philippine Islands. All parts of the archipelago have been visited, extensive collections have been made, and much information has been obtained regarding the conditions and development of the commercial fisheries, the fish trade, and collateral branches. This work was interrupted for several months while the *Albatross* was taken to Hongkong to undergo extensive repairs to machinery and rigging made necessary by the hard and continuous service to which the vessel had been subjected. The survey will be brought to a close in 1910 and the vessel will return to the United States.

In July, 1908, the schooner *Grampus* was employed for several weeks in investigations pertaining to the animal life of the Gulf Stream off southern New England. Collections were made with surface and deep-sea apparatus, and many soundings and temperature observations were made at various depths.

MARINE BIOLOGICAL LABORATORIES.

The marine biological stations of the Bureau at Woods Hole, Mass., and Beaufort, N. C., primarily established and maintained for study and experimentation in the interests of the fisheries and fish culture, have as usual been resorted to by competent investigators from all parts of the country. While the Bureau provides ample facilities for qualified students and does not attempt to dictate the scope and

character of their researches, it is noteworthy that a large percentage of the men of science who avail themselves of the laboratory privileges are engaged in work having more or less direct relation to practical questions, and in the past year an unusual amount of attention was given to subjects having an immediate economic bearing on the commercial fisheries and the cultivation of marine creatures.

THE FISHING INDUSTRY.

STATISTICS AND METHODS OF THE FISHERIES.

In the spring of 1909 the methods, apparatus, extent, and condition of the shad and alewife fisheries of Chesapeake Bay and tributaries were investigated by the steamer *Fish Hawk* and field agents. Each piece of apparatus set for shad and alewives was located on a chart, and arrangements were made to obtain statistics of the investment, catch, etc., for the season of 1909. The inquiry was still in progress at the close of the fiscal year. The number of pound nets and other fishing appliances in the Chesapeake basin has become so large that the movements of the anadromous fishes to their spawning grounds is seriously interfered with, and both natural and artificial propagation is curtailed to a degree that is most alarming. The downward trend of the fisheries and its cause have been repeatedly pointed out in the Bureau's reports, but the States interested have taken no action in the matter. This inquiry has been made in order to afford authentic data with which to demonstrate the urgent necessity for adequate legislative measures.

The local agents at Boston and Gloucester have collected statistics of the quantity and value of the fish landed at these ports by American fishing vessels. The returns have been published as monthly bulletins and distributed to the trade, and have also been issued as an annual bulletin. These fisheries are very valuable and represent about seven-eighths of the offshore food-fish fisheries of the Atlantic coast of the United States. The elaborate and accurate statistics of the yield have been gathered for a long series of years, and afford an invaluable basis for determining the general condition of the fish supply on the great "banks" off New England, the Canadian maritime provinces, and Newfoundland. From the following table, showing by months and species the quantity and value of the yield of these fisheries, it appears that in the calendar year 1908 there were landed over 6,600 cargoes of fish, having an aggregate weight of 181,465,000 pounds, worth to the fishermen $4,629,000. The receipts were nearly equally divided between the two ports, though at Boston practically the entire yield is landed in a fresh condition, while at Gloucester a very large percentage is salted. Compared with the previous year there is shown an increase of 7,548,000 pounds at Boston and a decrease of 17,654,000 pounds at Gloucester.

Quantities and Values of Certain Fishery Products Landed at Boston and Gloucester, Mass., by American Fishing Vessels during 1908, by Months.

Month.	No. of trips.	Cod.				Cusk.				Haddock.			
		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
		Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
LANDED AT BOSTON.													
January	242	1,118,700	$45,647			168,500	$3,406			2,960,550	$101,023		
February	318	1,141,400	43,060			135,700	3,762			4,962,150	118,433		
March	438	2,414,400	72,047			184,300	4,690			6,053,600	129,982		
April	484	1,936,200	65,266			173,300	4,118			3,527,100	109,558		
May	333	2,530,900	56,251			364,300	5,830			1,579,600	50,577		
June	341	3,358,600	86,036			155,000	2,566			2,397,000	63,835		
July	400	3,848,400	84,020			10,200	199			2,201,300	54,092		
August	304	3,244,600	72,394			21,000	351			2,875,900	67,467		
September	432	3,685,800	100,294			70,000	1,063			4,857,600	90,563		
October	442	2,129,500	73,001			63,500	1,216			4,119,400	108,573		
November	400	1,302,300	43,708			122,500	2,189			1,886,500	62,472		
December	408	1,618,400	50,097			140,800	2,814			2,393,800	71,291		
Total	4,542	28,329,200	791,821			1,609,100	32,204			39,814,500	1,027,866		
LANDED AT GLOUCESTER.													
January	48	53,665	1,359	123,120	$5,237	9,310	154	2,170	$54	219,366	6,597	2,300	$46
February	50	121,415	4,026	95,530	3,886	48,560	824	942	24	509,208	11,335	1,926	34
March	85	1,131,514	22,260	226,359	8,695	29,177	459	1,400	36	1,841,453	18,811	5,550	97
April	62	524,131	10,036	166,786	6,479	77,825	1,167	560	12	629,809	6,297	22,467	393
May	294	774,503	13,489	1,170,468	40,766	333,270	5,312	2,182	54	326,211	3,268	57,736	866
June	313	1,602,934	27,120	2,987,347	102,073	426,355	6,977	18,223	456	153,380	1,535	132,568	1,989
July	288	1,795,770	34,846	3,630,641	124,424	797,396	13,157	42,092	1,061	462,573	5,056	143,632	2,156
August	201	2,388,214	45,598	2,262,639	80,941	753,469	12,421	16,622	417	1,079,478	10,796	92,059	1,381
September	163	2,313,370	43,262	2,738,605	98,978	463,609	7,454	8,013	200	1,466,775	16,235	45,392	682
October	318	1,366,598	24,735	4,878,429	170,211	379,476	6,262	26,377	660	698,175	5,890	55,072	859
November	140	789,945	16,495	2,922,623	97,769	86,619	1,430	13,874	348	82,640	1,420	62,182	933
December	105	424,018	7,636	629,907	23,342	52,333	905	8,317	209	134,297	2,226	19,623	293
Total	2,067	13,286,077	250,862	21,832,454	762,801	3,457,399	56,522	140,772	3,531	7,603,365	89,466	640,507	9,729
Grand total	6,609	41,615,277	1,042,683	21,832,454	762,801	5,066,499	88,726	140,772	3,531	47,417,865	1,117,332	640,507	9,729
Grounds E. of 66° W. long	610	8,378,299	176,509	15,612,571	539,768	1,729,743	28,605	31,862	799	4,972,119	115,170	253,632	3,840
Grounds W. of 66° W. long	5,999	33,236,978	866,174	6,219,883	223,033	3,336,756	60,121	108,910	2,732	42,445,746	1,002,162	386,875	5,889
Landed at Boston in 1907	4,383	29,274,950	867,836			2,324,200	45,823			36,082,200	1,064,477		
Landed at Gloucester in 1907	2,702	16,677,711	344,319	15,368,065	575,097	4,702,421	79,813	72,357	1,764	5,732,903	93,783	462,802	8,966

Month.	Hake.				Pollock.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT BOSTON.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
January	466,300	$17,390			79,300	$2,815			8,700	$1,365		
February	318,000	14,898			44,500	1,579			14,800	1,852		
March	423,700	12,955			35,200	1,223			34,900	3,111		
April	318,700	9,942			42,300	532			33,300	3,320		
May	858,900	12,141			123,000	1,496			13,200	1,538		
June	1,123,100	16,733			127,000	1,797			74,200	5,395		
July	690,600	9,010			468,900	6,963			10,000	776		
August	1,281,500	19,988			520,800	7,762			73,200	5,366		
September	2,158,000	27,198			1,255,500	14,262			22,100	2,190		
October	2,545,200	25,518			1,024,700	14,057			3,600	440		
November	1,444,900	31,884			1,356,200	21,643			1,700	198		
December	837,200	17,123			1,209,400	13,439			13,750	1,126		
Total	12,466,100	214,780			6,286,800	87,568			303,450	26,677		
LANDED AT GLOUCESTER.												
January	13,131	497	565	$8	7,340	131	6,610	$100	92,425	9,834	2,300	$161
February	21,080	502	650	12	5,915	138	3,805	58	356,496	29,537	1,310	92
March	7,090	66			3,320	27	7,715	116	343,827	29,868		
April	32,940	296	375	5	122,020	1,289	6,489	98	82,749	8,884	250	16
May	290,508	2,337	5,292	72	1,775,472	13,419	34,112	512	463,642	26,087	35,210	2,545
June	1,090,052	8,721	33,893	509	1,506,711	11,301	226,914	3,402	312,159	17,586	25,295	1,770
July	1,128,324	9,146	20,939	314	660,549	5,157	165,799	2,486	358,952	16,090	16,227	1,152
August	730,139	6,031	18,513	279	289,479	2,306	121,363	1,820	240,571	13,949	93,636	6,471
September	975,126	7,800	4,468	67	294,766	2,246	89,410	1,340	274,940	23,682	669,298	46,798
October	3,183,719	24,697	12,382	188	336,026	2,617	224,457	3,367	238,670	20,031	96,133	6,774
November	364,067	3,210	17,075	256	615,963	5,123	112,820	1,704	60,583	5,527	5,900	412
December	132,174	1,219	8,290	123	524,365	3,846	90,711	1,361	50,788	4,882	999	72
Total	7,968,350	64,522	122,442	1,833	6,141,926	47,600	1,090,205	16,364	2,875,802	205,957	946,558	66,263
Grand total	20,434,450	279,302	122,442	1,833	12,428,726	135,168	1,090,205	16,364	3,179,252	232,634	946,558	66,263
Grounds E. of 66° W. long	2,074,101	19,938	92,875	1,390	302,954	2,928	426,710	6,411	2,688,073	194,509	946,050	66,227
Grounds W. of 66° W. long	18,360,349	259,364	29,567	443	12,125,772	132,240	663,495	9,953	491,179	38,125	508	36
Landed at Boston in 1907	9,963,400	193,812			4,244,100	67,288			215,630	22,252		
Landed at Gloucester in 1907	9,616,915	119,762	213,942	3,830	16,183,699	141,528	775,951	13,710	3,077,862	247,886	903,896	73,264

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., ETC.—Continued.

Month.	Mackerel.				Other fish.[a]				Total.				Grand total.	
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.			
LANDED AT BOSTON.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
January									4,802,050	$171,646			4,802,050	$171,646
February									6,616,550	183,584			6,616,550	183,584
March									9,146,100	224,008			9,146,100	224,008
April									6,030,900	192,736			6,030,900	192,736
May									5,469,900	127,833			5,469,900	127,833
June	2,529,525	$124,445	218,000	$13,987	272,000	$26,829			10,036,425	327,636	218,000	$13,987	10,254,425	341,623
July	1,836,185	103,271	32,600	1,932	785,600	57,745			9,851,185	316,076	32,600	1,932	9,883,785	318,008
August	52,400	4,888	16,000	1,180	241,800	26,404			8,311,200	204,620	16,000	1,180	8,327,200	205,800
September	800	65			176,220	8,576			12,226,020	244,211			12,226,020	244,211
October	3,400	456			6,000	716			9,895,300	223,977			9,895,300	223,977
November									6,114,100	162,094			6,114,100	162,094
December							680,000	$13,600	6,213,350	155,890	680,000	13,600	6,893,350	169,490
Total	4,422,310	233,125	266,600	17,099	1,481,620	120,270	680,000	13,600	94,713,080	2,534,311	946,600	30,699	95,659,680	2,565,010
LANDED AT GLOUCESTER.														
January					2,864,000	74,300	2,314,200	26,470	3,259,237	92,872	2,451,265	32,076	5,710,502	124,948
February									1,062,674	46,362	104,163	4,106	1,166,837	50,468
March									3,356,381	71,491	241,024	8,944	3,597,405	80,435
April									1,469,474	27,969	196,927	7,003	1,666,401	34,972
May			8,600	516					3,963,600	63,912	1,313,600	45,331	5,277,206	109,243
June	343,080	16,554	2,737,200	126,555	150,200	1,665			5,584,871	91,459	6,161,440	236,754	11,746,311	328,213
July	369,540	18,306	265,000	12,774	104,750	1,014			5,677,854	102,772	4,284,330	144,367	9,962,184	247,139
August	21,960	1,740	42,200	3,434	613,744	5,429	59,000	1,540	6,117,054	98,270	2,706,032	96,283	8,823,086	194,553
September					1,810,300	13,954	175,600	1,764	7,598,886	114,633	3,730,786	149,829	11,329,672	264,462
October	349,850	38,790	600	72	410	53			6,552,924	123,075	5,293,450	182,131	11,846,374	305,206
November	1,080	79	147,000	15,065	1,111,400	12,503	1,465,400	25,200	3,112,297	45,787	4,746,874	141,687	7,859,171	187,474
December					810,000	22,160	3,934,596	69,028	2,127,975	42,874	4,692,443	94,428	6,820,418	137,302
Total	1,085,510	75,469	3,200,600	158,416	7,464,804	131,078	7,948,796	124,002	49,883,233	921,476	35,922,334	1,142,939	85,805,567	2,064,415
Grand total	5,507,820	308,594	3,467,200	175,515	8,946,424	251,348	8,628,796	137,602	144,596,313	3,455,787	36,868,934	1,173,638	181,465,247	4,629,425
Grounds E. of 66° W. long	1,690,040	125,053	2,989,800	150,096	3,540,444	95,147	8,194,196	131,298	25,375,773	757,859	28,547,696	899,829	53,923,469	1,657,688
Grounds W. of 66° W. long	3,817,780	183,541	477,400	25,419	5,405,980	156,201	434,600	6,304	119,220,540	2,697,928	8,321,238	273,809	127,541,778	2,971,737
Landed at Boston in 1907	3,542,656	220,081	394,000	27,287	2,070,200	162,457			87,717,336	2,644,026	394,000	27,287	88,111,336	2,671,313
Landed at Gloucester in 1907	548,370	27,230	5,991,860	444,771	7,517,550	144,313	15,614,112	271,754	64,057,431	1,198,634	39,402,985	1,393,156	103,460,416	2,591,790

[a] Includes herring from Newfoundland (3,534,000 pounds frozen, $94,360, and 8,194,196 pounds salted, $131,298).

The most important of the food fishes taken in the offshore vessel fisheries is the cod, of which 63,447,000 pounds were taken on the Atlantic coast and 14,594,000 pounds on the Pacific coast in 1908, the value of the combined catch being over $2,240,000. In 1904, 1905, and 1906 some large fares of cod were taken with purse seines in the vicinity of Sable Island, but in 1907 this method of capture was not successful, and in 1908 the purse seines gave way to hand lines and trawls.

The haddock fishery continues to have the most improved type of vessels. While the fleet has not increased in number, the tonnage is considerably greater than formerly; and vessels of the newer pattern cruise over more ground than the others and operate double the quantity of fishing gear. Practically the entire haddock catch is landed fresh and is intended for immediate consumption. More than 48,000,000 pounds, with a value of $1,127,000, were taken in 1908, an increase of nearly 7,000,000 pounds and a decrease of $40,000 in value as compared with the previous year.

The catch of pollock for the Boston and Gloucester markets in 1908 fell below that of 1907 by nearly 8,000,000 pounds. The product of fresh and salted fish was 13,500,000 pounds, selling for $152,000. A marked change has occurred in this fishery within a few years. Formerly the fish were taken only with lines, but now a large part of the catch is made with purse seines that are thrown about the schools in shallow water off the New England coast.

The yield of halibut in 1908 was 4,125,000 pounds, valued at $298,000, a very slight decrease as compared with the previous year. Georges Bank has been more actively resorted to for halibut than any other ground off the United States coast, and it continues to be a productive ground. In 1908, however, Bacalieu Bank, lying off the eastern coast of Newfoundland, was a more prolific ground. It covers a large area, and in recent years has been extensively resorted to by our vessels. The catch of halibut on the Pacific coast exceeds that on the Atlantic by several million pounds. In addition to the large quantity taken by American vessels on various grounds in southeastern Alaska, there is a considerable amount caught by Canadian vessels and shipped into the United States.

The available supply of mackerel continues to be small, and the annual catch now is insignificant compared with that twenty-five or thirty years ago. The quantity of salt fish landed in 1908, namely, 21,267 barrels, was about 10,000 barrels less than in 1907, but over 11,000 barrels more than in 1906. The receipts of fresh mackerel were 57,566 barrels, an increase of 1,397 barrels over 1907.

The relative productivity of the fishing grounds lying off the United States coast and off the coasts of Newfoundland and the Canadian provinces is shown in the following table, which gives, by

species, the quantity and value of the fish landed at Boston and Gloucester by American fishing vessels in 1908. Over 70 per cent of the entire catch was obtained on grounds lying off the United States coast—that is, west of the sixty-sixth meridian of west longitude.

QUANTITY AND VALUE OF FISH LANDED BY AMERICAN FISHING VESSELS AT BOSTON AND GLOUCESTER, MASS., IN 1908, FROM GROUNDS OFF THE COASTS OF THE UNITED STATES, NEWFOUNDLAND, AND CANADIAN PROVINCES.

Species.	United States.		Newfoundland.		Canadian Provinces.		Total.	
	Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
Cod:								
Fresh	33,182,828	$865,257	1,135,100	$24,268	7,297,349	$153,158	41,615,277	$1,042,683
Salted	6,219,883	223,033	3,925,014	136,581	11,687,557	403,187	21,832,454	762,801
Cusk:								
Fresh	3,334,331	60,081	.....	.....	1,732,168	28,645	5,066,499	88,726
Salted	108,910	2,732	3,971	100	27,891	699	140,772	3,531
Haddock:								
Fresh	42,425,206	1,001,933	.....	.....	4,992,659	115,399	47,417,865	1,117,332
Salted	386,875	5,889	31,713	476	221,919	3,364	640,507	9,729
Hake:								
Fresh	17,991,949	256,417	41,975	353	2,400,526	22,532	20,434,450	279,302
Salted	29,567	443	28,588	422	64,287	968	122,442	1,833
Pollock:								
Fresh	12,122,957	132,219	.....	.....	305,769	2,949	12,428,726	135,168
Salted	663,495	9,953	25,109	377	401,601	6,034	1,090,205	16,364
Halibut:								
Fresh	491,179	38,125	1,158,235	75,092	1,529,838	119,417	3,179,252	232,634
Salted	508	36	879,728	61,577	66,322	4,650	946,558	66,263
Mackerel:								
Fresh	3,817,780	183,541	.....	.....	1,690,040	125,053	5,507,820	308,594
Salted	477,400	25,419	.....	.....	2,989,800	150,096	3,467,200	175,515
Herring:								
Fresh	3,174,320	29,284	3,534,000	94,360	.....	.....	6,708,320	123,644
Salted	393,200	5,292	8,194,196	131,298	.....	.....	8,587,396	136,590
Swordfish:								
Fresh	1,344,410	118,006	.....	.....	13,444	1,627	1,357,854	119,633
Other fish:								
Fresh	880,250	8,071	.....	.....	.....	.....	880,250	8,071
Salted	41,400	1,012	.....	.....	.....	.....	41,400	1,012
Total	127,086,448	2,966,743	18,957,629	524,904	35,421,170	1,137,778	181,465,247	4,629,425

INVESTIGATION OF THE MACKEREL FISHERY.

Since early times the taking of mackerel has been one of the great high-sea fisheries of the country, but since 1886 the fishery has yielded only a comparatively small percentage of the fish caught for many years immediately preceding. It has not been determined whether the mackerel are now actually scarcer than formerly, whether they have changed their grounds, or whether the fishing methods are such as to disperse the schools and reduce the catch.

The migratory habits of mackerel continue to baffle the skill of the most experienced fishermen. Each season during the past five years a large body of mackerel has appeared off the Cape Shore in June, remaining in those waters about six weeks, then suddenly disappearing, and few fish being seen or taken during the rest of the year. In 1907 and 1908 after the disappearance of this body of fish the seining fleet spent several weeks cruising over the usual grounds with little or no success. These periods of great scarcity occurring

in the middle of the season cause considerable anxiety among fishermen and owners of vessels.

The summer mackerel grounds extend from Block Island to the Strait of Canso. In their search for fish few vessels care to take the risk of being absent from the main body of the fleet more than a day or two at a time. Occasionally individual vessels will cruise in distant localities, but as a rule even the most distant ones keep in touch with the fleet.

Many theories are advanced by fishermen regarding the body of fish that suddenly leaves the coast each year. In the opinion of many fishermen the introduction of purse seines and gill nets has been instrumental in diverting mackerel from their regular course. Formerly it was the custom early in July for a large fleet of vessels fitted with hooks and lines to repair to the Gulf of St. Lawrence, where the fishery was successfully carried on until the latter part of October. The large quantity of toll bait used was no doubt the means of holding the fish on the ground. Mackerel continued to be fairly plentiful in that region until vessels ceased to fish with the apparatus mentioned and employed seines as a method of capture. Shortly after that period mackerel were less plentiful and during the past twenty years few fish have been taken in the Gulf of St. Lawrence. In the last two or three years several vessels have visited that region in the fall for the purpose of testing the ground with toll bait. The result of these experimental trips has led fishermen to believe that if toll bait were freely used it would have a tendency to attract mackerel to all the grounds along the Atlantic coast.

The movements of mackerel during the early part of the season of 1909 were different from those noticed in 1907 and 1908. Usually mackerel are first seen about the middle of March in the vicinity of Cape Hatteras; but this year, owing to the prevailing rough weather on that part of the coast where the fishery is carried on, mackerel were not reported until April 17, and few fish were taken until May 12, when four vessels landed trips in New York, immediately followed by eight other seiners capturing schools off the coast of New Jersey. In the latter part of May, few fish being found on the southern grounds, and those sighted hard to catch, the seining fleet fitted for the Cape Shore, where mackerel had been reported. A few hauls were made off that coast on June 7, and fairly good fishing was experienced for about two weeks, after which time the schools of fish suddenly disappeared. This caused most of the fleet to again visit the southern grounds, where fishing was continued until the latter part of June.

Ordinarily the vessels that carry seines capture a great many more mackerel than those fitted with gill nets, but this season, since the mackerel did not appear at the surface as in previous years, the

netters did exceptionally well and landed nearly as many fish as the seining fleet.

In the spring of 1909, at the special solicitation of the Board of Trade and the Master Mariners' Association of Gloucester, Mass., the Bureau undertook an investigation of the mackerel in the interests of the fishing industry. The auxiliary schooner *Grampus* was detailed for the purpose, and an experienced mackerel fisherman was placed in charge of the inquiry, which began in April and was in progress at the close of the year. One of the main objects of the inquiry is to locate the body of fish supposed to be on grounds remote from those cruised over by the seining fleet. The apparatus for locating and making experimental catches of fish consists of gill nets and lines; tow nets are also carried for the purpose of detecting the presence of the minute crustaceans upon which mackerel chiefly subsist. The cruising will extend from Cape Henry northward along the coast to the Gulf of St. Lawrence and Labrador. The work, so far, has been chiefly on offshore grounds from Cape Henry to Cape Cod.

ALASKA SALMON SERVICE.

In the annual inspection of the salmon fisheries of Alaska, the agents visited practically all the fishing centers with the exception of arctic Alaska and parts of western and central Alaska, and obtained information regarding the condition and extent of all the other fisheries of the Territory in addition to the salmon. The agents' detailed report on the fishing industry was published in April, 1909.

The salmon fisheries in 1908 were more extensive and valuable than ever before. In taking the catch and preparing and transporting the canned, pickled, fresh, and frozen fish, 12,183 persons were employed and $9,298,800, exclusive of cash capital, were invested, and the value of the output was $10,683,051. The total quantity of salmon taken was 198,952,814 pounds, of which 125,790,470 pounds represented red salmon, 48,029,055 pounds humpbacks, 15,578,570 pounds dog salmon, 5,291,200 pounds coho or silver salmon, and 4,263,519 pounds king salmon.

Fifty canneries and 40 salting establishments were operated, and the quantity of salmon therein utilized was larger than ever before. The pack of canned salmon was 2,618,048 cases, equivalent to 2,606,972 standard cases of 48 one-pound cans each, and the salmon and salmon bellies salted aggregated 35,949 barrels and 6,247 half barrels.

In southeast Alaska it was found that trap-net fishermen in some localities were openly violating the law by failing to observe the close season, and this too at a time when the canneries were glutted and unable to handle the legitimate catch. Violations to the number

of 53 were reported to the grand jury, which brought in a true bill in each instance, and the cases were tried in the district court at Skagway. The owners of the traps agreed to assume responsibility for the actions of their employees, and plead guilty, whereupon the court imposed a fine of $150 in each case. There is a healthy public sentiment in favor of the strict enforcement of laws for the protection of the salmon, and this sentiment is shared by a very large proportion of the firms and companies having money invested in the fisheries.

In the pickling of salmon bellies, there has always been a very large waste, as the muscular tissue constituting the belly, the only part utilized, represents only a small fraction of the total flesh. This waste, which has amounted to several million pounds annually, appeared to be unjustifiable, and was accordingly brought to the attention of the Secretary of Commerce and Labor with a recommendation that the practice be prohibited. The waste was held to be in violation of existing law, and its interdiction was set forth in the following circular notice to all packers of salmon in Alaska, issued by the Commissioner of Fisheries under date of April 18, 1908, and affecting the season of 1909:

It is desired to call the attention of all packers of salmon in Alaska to section 8 of the act for the protection of the fisheries of Alaska, approved June 26, 1906, which reads as follows:

"SEC. 8. That it shall be unlawful for any person, company, or corporation wantonly to waste or destroy salmon or other food fishes taken or caught in any of the waters of Alaska."

The present methods of preparing the bellies of salmon for the market involve the waste of a large part of the edible portion of the fish. It is believed that this waste is contrary to the spirit and letter of the above provision. The Secretary of Commerce and Labor, who is charged with the enforcement of the Alaska fisheries act, has notified this Bureau that the practice of curing and preserving the so-called belly of the salmon, which results in the waste of a large proportion of the edible portion of the fish, is a wanton waste within the meaning of section 8 above, and that after January 1, 1909, those who engage in this practice will be reported for prosecution, as provided for in the act.

Complaints have reached the Bureau from salmon fishermen in southeast Alaska relative to injury done to the fisheries by the discharge of sawdust and other sawmill refuse into waters where salmon run. Such materials are generally recognized as harmful to fish and fishing, and are the subjects of special laws in many States, but there is nothing in the Alaskan code to cover the case. In order to guard against the pollution of the streams and other waters of the Territory by all kinds of industrial wastes, it is desirable that proper legislation be enacted by Congress at an early date. It will be easier to keep the public waters free from noxious discharges by anticipating the industrial development than by attempting to abate nuisances after they have become established.

Nushagak and Wood rivers, in western Alaska, were closed to commercial fishing by an order of the Secretary of Commerce and Labor dated December 19, 1907, and first effective during the season of 1908. The order was as follows:

A hearing having been given at the Department of Commerce and Labor, beginning December 16, 1907, at which all persons interested in the closing or nonclosing of Wood and Nushagak rivers, Alaska, for fishing purposes were fully heard, due notice of which was given according to law, by virtue of the authority vested in me by section 6 of "An act for the protection and regulation of the fisheries of Alaska," approved June 26, 1906, it is hereby ordered that until further notice Wood River, a tributary of Nushagak Bay, in the district of Alaska, and the region within 500 yards of the mouth of said Wood River be closed to all commercial fishing, and that all commercial fishing be prohibited in Nushagak River proper.

This order becomes effective January 1, 1908.

The presence of the salmon agent in the region of Wood and Nushagak rivers for the purpose of enforcing the foregoing order made possible an experimental count of red salmon on a scale and in a manner never before attempted. In conjunction with the Alaska Packers' Association of San Francisco and the Alaska-Portland Packers' Association of Portland, the Bureau of Fisheries placed a rack across the foot of Lake Aleknagik, the first of the Wood River series of lakes. and provided this rack with tunnels or gates through which the migrating salmon had to pass to reach their spawning grounds. A daily tally was kept, and a count of the entire run was obtained in such a way as to give a figure that may be accepted as very close approximation to the actual number. A few hundred fish passed up before July 1 and several thousand during the first ten days in August, but the height of the run was from July 7 to July 29. On July 14 over 402,000 fish were counted and on the next day over 324,000. The total tally was 2,603,655 fish, which escaped the very active fishing in Nushagak Bay; in addition to these several million fish are known to have ascended other tributaries of Nushagak Bay to their spawning grounds. From the data at hand it appears that the maximum number of red salmon that entered Nushagak basin in 1908 was 13,600,000 and the minimum number was not less than 10,100,000, of which 6,400,000 fish were caught and utilized at the local canneries. Therefore under the most favorable conditions for reproduction, 52.9 per cent of the run escaped, and under the most unfavorable, 36.6 per cent. It is the intention to continue this experimental counting of salmon in the expectation that accurate data may be obtained relative to the natural increment of the fish, so that, knowing the approximate size of the run, the minimum number necessary to maintain the supply may be allowed to escape and the remainder placed at the disposal of the fishermen.

Seven salmon hatcheries operated in 1908–9 handled 176,407,000 eggs, of which number 96,397,000 were incubated at the two government hatcheries at Yes Bay and Afognak. The fry produced by the five private hatcheries numbered 74,249,750 and by the government hatcheries 87,998,770, a total of 162,248,520. Larger results are anticipated when the new station at Afognak is fully equipped.

Other important fisheries of Alaska are the cod, halibut, herring, whale, and fur seal. A number of hitherto minor products are receiving more attention each year, and in a short time will doubtless add materially to the value of the fisheries; in 1908 flounders, pollock, rock cod, and whitefish appeared in the returns for the first time. The extent of the entire fishing industry of Alaska, as determined by the salmon agents, was as follows: Persons engaged, 13,337; investment, $10,319,784; value of products, $11,847,443.

ALASKAN FUR-SEAL SERVICE.

On the establishment of the Department of Commerce and Labor, in 1903, the Alaskan fur-seal service was transferred thereto from the Department of the Treasury, to which it had been attached for many years. In the Department of Commerce and Labor this service formed a distinct branch and was administered through the Secretary's Office until December 28, 1908, when it was transferred to the Bureau of Fisheries. The Commissioner of Fisheries has appointed a special board, composed of five members of the Bureau's staff who have personal knowledge of the Alaskan fur seals, and to this board will be assigned for consideration and recommendation all matters pertaining to the seal life on the Pribilof Islands, the blue foxes, and other animal resources on the islands, and the Government's relations to the natives and the lessees. On January 13, 1909, the Secretary, on the recommendation of the Commissioner, appointed an advisory board for the fur-seal service, consisting of Dr. David Starr Jordan, Dr. Leonhard Stejneger, Dr. C. Hart Merriam, Mr. Frederic A. Lucas, Hon. Edwin W. Sims, Hon. Frank H. Hitchcock, and Mr. Charles H. Townsend. The Government is thus enabled to avail itself of the expert knowledge possessed by these naturalists and officials, who, through visits to the seal islands and through previous duty on fur-seal commissions or in the administration of the fur-seal service, are familiar with the problems involved in the management of the seal herd and the seal islands.

From the report of the agent at the seal fisheries it appears that during the season which closed July 31, 1909, the lessees were unable to obtain the quota of 15,000 skins, for the reason that the requisite number of bachelor seals did not appear in the drives during the legal season. The total take of skins was 14,336, of which 11,022 came from St. Paul Island and 3,314 from St. George Island.

Statistics of the seals driven for killing show that on the two islands 31 and 37 per cent, respectively, of the drives were released as being too large, too small, or marked for breeders. There was a noteworthy scarcity of very small seals in the drives, even late in the season when the yearlings are expected to come in numbers.

The quota of bachelor seals to be preserved for breeding purposes was marked and released during the last week in June. The number was 2,000, half of them being 2 years old and half 3 years old.

A count of the breeding bulls between July 13 and 16 showed 1,071 with harems on St. Paul Island and 267 with harems on St. George Island, and 422 others on both islands. The average number of cows per harem was ascertained to be 42.1 on St. Paul and 34.7 on St. George.

During the season a special count of the seal herd was made by Mr. George A. Clark, a member of the fur-seal commission of 1896–97, to whom was assigned the detailed study of the rookeries in those years. His investigations in 1909, following the same methods and having the same scope, are particularly interesting and important. It appears that the fur-seal herd has undergone a heavy decline during the past thirteen seasons, as evidenced by the fact that in 1896 and 1897 there were 157,000 and 130,000 breeding females, while in 1909 there were only 50,000. This decline has been caused by the continuance of pelagic sealing, which results in the killing of the females in excess of the natural increment of young breeders. The injurious effects of pelagic sealing have greatly increased in recent years owing to the presence of a large fleet of Japanese vessels using firearms and operating throughout the season in close proximity to the rookeries, sometimes forming a close cordon through which the seals have had to pass on their way from and to the rookeries.

The fur-seal service has come under the jurisdiction of the Bureau at a time when the condition of the seal herd is worse than ever before, when the outlook is most discouraging, and when the contract for the lease of the islands for a period of twenty years must, under the law, be renewed. Under the existing circumstances the value of the franchise is greatly diminished, large financial losses may be sustained by the Government, and the perpetuity of the herd is seriously menaced. For many years the precarious condition of the fur-seal herd has been constantly brought to the attention of the Government by various persons well qualified to present the matter, and every authority has forcefully pointed out the immediate necessity of the Government's concluding some arrangement by which the slaughter of seals when away from the islands in search of food should be prevented. The net outcome of the work, arguments, recommendations, and pleas of a long procession of special commis-

sioners, experts, and agents has been (1) the passage of a law by which American fishermen are prohibited from engaging in pelagic sealing while fishermen of all other nationalities are permitted to do so, and (2) the steady and rapid decimation of the herd, which has occurred entirely independently of the legitimate operations on the islands.

If pelagic sealing could have been stopped in 1897, the seal herd to-day would contain 300,000 breeding cows (as against 50,000, the number for the season of 1909), and the product of the hauling grounds would have risen to 50,000 skins, yielding a government revenue of $500,000, as against less than 15,000 skins and a government revenue of $143,000 for the present year. Without the drain of pelagic sealing the herd would continue to increase almost indefinitely.

The Alaskan fur seals constitute the most valuable fishery resource that any government in the world ever possessed. It is little less than a national disgrace that the herd of four to six million seals which came into our possession when Alaska was acquired from Russia and has been under our charge ever since should have been allowed to dwindle until to-day it numbers less than 150,000 of all ages. The mildest way in which to characterize the dissipation of this great source of wealth to our people and of revenue to our Government is that it is a serious indictment of our business capacity. The extent of our loss may be partially seen when it is stated that the failure to maintain the seal herd has during the last thirteen years resulted in a net loss of revenue of not less than $1,600,000, has permitted nearly 300,000 fur seals, having a market value of over $5,700,000, to be appropriated by aliens, and has encouraged those nefarious pelagic operations by which additional fur seals having a value of at least $5,000,000 have been killed at sea, but not recovered; while through the slaughter of breeding females their pups—on the islands, unborn, and prospective—with a potential value of fully $20,000,000, have been sacrificed and wasted.

It is most essential to the interests of this Government and the welfare of the fur-seal herd that appropriate action be taken at once looking to the prohibition of pelagic sealing by subjects of the countries most concerned; and recommendations to this end already submitted to the Department are now renewed and strongly urged.

MISCELLANEOUS ACTIVITIES.

COOPERATION WITH THE STATES.

Active cooperation with the various States in fish-cultural and fishery work has been a feature of the Bureau's policy for many years. This cooperation in the interests of the public welfare will

continue and become more effective so far as the resources and functions of the Bureau will permit.

It is noted with regret that there is a desire on the part of some States to control, curtail, restrict, and handicap, by legislative action or official regulation, the work of the Bureau in artificial propagation; and it may become necessary to resort to the courts to determine the status and rights of federal fish-culture in state and interstate waters in pursuance of acts of Congress. One of the latest exhibitions of this attitude of certain States is the case of Michigan, whose legislature has taken entirely out of the Bureau's hands the collection of eggs of the commercial fishes of the Great Lakes. No necessity for such a course was shown, and the action of the State was in opposition to the expressed wishes of the Bureau and inimical to the interests of fish preservation.

Allotments aggregating 713,391,265 fertilized fish eggs were made by the Bureau to the fish commissions of the various States, as follows:

ALLOTMENTS OF FISH EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR ENDED JUNE 30, 1909.[a]

State and species.	Eggs.	State and species.	Eggs.
California:		New York—Continued.	
Chinook salmon	32,039,265	Landlocked salmon	30,000
Connecticut:		Rainbow trout	20,000
Lake trout	300,000	Blackspotted trout	25,000
Brook trout	30,000	Ohio:	
White perch	5,000,000	Pike perch	158,725,000
Yellow perch	10,000,000	Whitefish	55,548,000
Illinois:		Oregon:	
Rainbow trout	50,000	Chinook salmon	6,581,000
Whitefish	7,000,000	Brook trout	310,000
Pike perch	25,000,000	Blackspotted trout	100,000
Maine:		Steelhead trout	50,000
Landlocked salmon	300,000	Pennsylvania:	
Brook trout	300,000	Pike perch	223,125,000
Maryland:		Lake trout	3,000,000
Rainbow trout	50,000	Blackspotted trout	25,000
White perch	2,000,000	Silver salmon	75,000
Massachusetts:		Whitefish	58,572,000
Rainbow trout	50,000	Vermont:	
Michigan:		Lake trout	400,000
Landlocked salmon	30,000	Washington:	
Lake trout	3,500,000	Steelhead trout	50,000
Pike perch	50,000,000	Wisconsin:	
Smelt	22,500,000	Lake trout	12,126,000
Nevada:		Whitefish	20,000,000
Steelhead trout	50,000	Wyoming:	
New Hampshire:		Grayling	350,000
Silver salmon	50,000	Brook trout	50,000
Landlocked salmon	50,000	Blackspotted trout	210,000
Lake trout	300,000	Landlocked salmon	10,000
New York:		Steelhead trout	60,000
White perch	12,350,000		
Lake trout	3,000,000		

[a] Also there were allotted to California 765 crappie and strawberry bass, 3,600 bream, and 240 yellow-perch fingerlings, yearlings, and adults; to Colorado, 50,000 blackspotted-trout fry; to Minnesota, 4,420 crappie and strawberry bass and 816 largemouth black-bass fingerlings, yearlings, and adults; and to New York, 200,000 brook-trout fry.

In the collection of whitefish and pike-perch eggs on Lake Erie the Bureau had the active cooperation of the Ohio and Pennsylvania fish commissions.

An act of Congress approved March 4, 1909, and effective on that date, authorized and directed the Secretary of Commerce and Labor, on the request of the governor of the State of North Carolina, to designate assistants of the Bureau of Fisheries and Coast and Geodetic Survey to cooperate with the Fish Commissioner of North Carolina in surveying and marking the fishing grounds of the State. Cooperation of a similar nature had been given by the Bureau on several occasions, but owing to the more elaborate character of the survey now required by the State and the more permanent nature of the marks to be placed on the fishing grounds, it was thought that specific authority should be obtained from Congress, that the assistance of the Coast and Geodetic Survey should be invoked, and that an appropriation covering the cost of the work should be provided. As the act carried no appropriation, it has been impossible for the Bureau to proceed in the matter.

RELATIONS WITH OTHER GOVERNMENT BUREAUS.

At the request of the Bureau of the Census, four agents of the Bureau of Fisheries were detailed to assist in the taking of a fishery census for the calendar year 1908, and in continuation of the understanding between the two Bureaus no general statistical work was done by this Bureau during the year.

The food and drug board of the Department of Agriculture has submitted to the Bureau from time to time samples of fishery products for identification and for expert opinion as to their proper labeling under the food and drug law. Members of the Bureau's staff have attended hearings before the board and given testimony in fishery cases.

The Bureau of Chemistry of the Department of Agriculture has courteously made analyses of samples of water from the various hatcheries. The object of these analyses is to show the special qualities as to gaseous and mineral content of the fish-cultural waters, and the correlation of the chemical properties with the growth and health of the fish.

The question of stocking with food and game fishes the reservoirs and lakes formed in connection with government irrigation and reclamation projects has been brought up at various times. A conspicuous case is that of the Roosevelt Dam in Salt River, Arizona, which will develop an artificial lake from 10 to 25 miles long and 70 to 220 feet deep. The lake will be near the center of the territory and a long distance from any supply of fish. The Department of the Interior has expressed a desire to have the Bureau stock this lake with fish for the benefit of the people, and the Bureau has agreed to undertake this work. The Government is the owner in fee of all lands covered by the lake, and the lands immediately surrounding have been set

apart as a government bird preserve. These conditions should result in federal surveillance and control.

The Bureau will undertake to stock all such reservoirs with suitable fish and to maintain the supply of fish therein, but it is thought that a definite policy should be determined on for the exercise of proper control over the fishing in such waters. Reasonable restrictions on the times and methods of fishing should be prescribed after investigation, but the Bureau is without any authority or machinery to enforce regulations; and it is apparent that there should be some arrangement for cooperation between the Reclamation Service, which controls the reservoirs, and this Bureau, which will keep them supplied with fish.

Closely connected with this matter is the necessity for protecting the fish life in the irrigation canals and ditches in the West. The absence of guards or screens at the heads of ditches permits the fish to run in from the canals and become stranded. Furthermore, the annual draining of the canals and ditches leaves fish without water. In this way tremendous destruction of fish is now going on, and much larger loss will ensue later. It is therefore very important that general regulations be framed for the preservation of fish in such waters by requiring the use of effective screens or wheels.

INTERNATIONAL FISHERY MATTERS.

The treaty between the United States and Great Britain signed April 11, 1908, provides for joint governmental control and administration of the fisheries of the contiguous waters of the United States and Canada. To carry out the terms of the treaty two international fisheries commissioners have been appointed—Dr. David S. Jordan on behalf of the United States and Hon. S. T. Bastedo on behalf of Canada. The commissioners are charged with the preparation of uniform and common international regulations for the protection and preservation of the food fishes of the boundary waters. The field investigations preliminary to the formulation of the necessary regulations were conducted by the commissioners in the summer of 1908, and at the request of the Department of State the three chiefs of division of the Bureau were detailed to assist in these inquiries, which covered all the international waters from Passamaquoddy Bay to Puget Sound. The report of the commissioners has been placed in the hands of the President of the United States and the Governor-General of Canada for promulgation.

At the request of the Department of State the Bureau, as in the three previous years, detailed a representative to proceed to Newfoundland and report on the operations of American fishing vessels on the coast of that colony under the modus vivendi, pending the settlement of the dispute as to the rights of our fishermen under the

treaty of 1818. This detail extended from September, 1908, to January, 1909, during a part of which period the revenue cutter *Gresham* was assigned to this work and served as the headquarters of the Bureau's representative. American vessels that now resort to the "treaty shore" of Newfoundland are engaged only in the herring fishery. In 1908–9 these vessels numbered 42, whose catch consisted of 32,741 barrels of salted herring, valued at $132,695, and 18,157 barrels of frozen herring, valued at $105,095. Two other vessels were lost while in this fishery. Canadian vessels, several of which were chartered by American firms, secured 2,737 barrels of salted herring, worth $11,773, and 6,505 barrels of frozen herring, worth $29,273. The season passed without any disturbance.

INTERNATIONAL FISHERY CONGRESS.

The Fourth International Fishery Congress convened in the city of Washington in September, 1908, in response to an invitation extended in 1905 by the Department of Commerce and Labor and the American Fisheries Society. The foreign delegates gathered at the Department of State on the morning of September 22 and were greeted by the Acting Secretary, Hon. A. A. Adee. The opening meeting was held at the hall of the National Geographic Society, the United States Commissioner of Fisheries presiding. Addresses of welcome were made by Hon. Oscar S. Straus, Secretary of Commerce and Labor, on behalf of the United States; by Hon. Henry L. West, Commissioner of the District of Columbia, on behalf of the city of Washington; and by Dr. Hugh M. Smith, president of the American Fisheries Society, on behalf of the society. A response in the name of the foreign delegates was made by Dr. P. P. C. Hoek, scientific fishery adviser of the Dutch Government. The nominations of Prof. Hermon C. Bumpus, director of the American Museum of Natural History, as president of the congress, and of Dr. Hugh M. Smith, Deputy Commissioner of Fisheries, as secretary-general, were ratified, and fifteen vice-presidents from different countries represented were elected. Thereafter two sessions were held daily, the final meeting being on the afternoon of the 25th.

The membership of the congress numbered more than 400. Fifteen countries were represented by official delegates, and 11 other countries by delegates of societies and by private individuals. In addition to a number of delegates at large on behalf of the United States Government, four executive departments, the United States National Museum, and the Smithsonian Institution were officially represented. There were also duly appointed delegates from 43 American States and Territories and 20 American societies, clubs, and institutions. There were in attendance many of the leading fishery

workers of the world, and as a whole the gathering was the most noteworthy and important of the kind ever held in the Western Hemisphere.

There were presented a large number of papers of exceptional merit, which, with the discussion elicited, covered nearly every phase of fishing, fishery legislation, aquiculture, acclimatization, and scientific investigation of aquatic problems. Many of the papers were submitted in competition for the 18 cash prizes aggregating $2,200 offered by various institutions and individuals. By direction of the Secretary, the publication of the papers and proceedings of the congress will be undertaken by the Bureau, which has reserved for this purpose the Bulletin for 1908.

Among the resolutions and views adopted by the congress were the following: (1) Expressing pleasure that the long-standing fishery dispute between the United States and Great Britain affecting waters on the northeast coast of North America is to be submitted to settlement by arbitration; (2) commending the President of the United States for his stand in behalf of the conservation of natural resources; (3) advocating the establishment, in all countries having important fisheries, of national schools of fisheries and fish culture under government auspices; (4) urging the necessity of simplifying fishery laws by the elimination of qualifying clauses which often provide loopholes through which offenders may escape penalties and waters remain unprotected; (5) favoring the formation of the Appalachian Forest Reserve and other similar reserves which embrace the headwaters of important fishing streams; (6) advocating uniform measures on the part of the United States and Canada for the extermination or utilization of the dogfishes, in view of the great injury done thereby to the fishing industry; (7) reaffirming the action of former international fishery congresses in recommending an international oceanographic exploration of the Mediterranean in the interests of the fisheries.

This series of congresses was organized and inaugurated at Paris in 1900, the intervening meetings having been held at St. Petersburg in 1902 and Vienna in 1905. The next congress will convene at Rome in 1911.

EXPOSITIONS.

The Bureau took part in two expositions during the year, one at Seattle, Wash., and the other at Quito, Ecuador.

In an act of Congress approved May 27, 1908, special provision was made for the Bureau's participation in the Alaska-Yukon-Pacific Exposition, which opened at Seattle June 1, 1909, for a period of five and a half months. Preparations were begun in September, 1908, and by the opening day the installation had been completed and

the exhibit was ready. The exhibit was designed primarily to illustrate the operations of the Bureau in the study of the commercial fisheries, the propagation of fish, and the investigation of scientific matters pertaining to fishing and fish culture. The amount of money available did not permit a comprehensive display, but the functions, purposes, and work of the Bureau were shown in outline by an aquarium and a carefully selected series of apparatus, specimens, charts, and models. The exhibit occupied a separate building in the rear of and connected with the main government building. The fisheries annex was particularly convenient, well adapted for its purposes, and of ample dimensions to accommodate all the available material. The building contained 9,250 square feet of floor space, of which 5,500 square feet was devoted to the aquarium. The latter was a special feature, and contained fishes and other aquatic creatures of both fresh and salt water. It comprised 30 tanks of several sizes and a central pool for large specimens. Local waters were drawn on largely for stocking the aquarium, but interesting collections were sent from the East and from the coast of California. An assortment of fishes of the Hawaiian Islands, provided by those in charge of the Hawaiian exhibit, proved very attractive.

Under an act of Congress providing for the participation by the United States in an exposition to be held at Quito in commemoration of Ecuador's one hundredth anniversary of independence, this Bureau was called on for such material as would represent its functions for installation in the United States building. The exposition continued for a period of three months, beginning August 9, 1909. Owing to the very small amount of money available, the exhibit was necessarily confined to pictures, publications, maps, and a descriptive pamphlet printed in Spanish. The Bureau was awarded a grand premium for its exhibit.

PUBLICATIONS AND LIBRARY.

There were received from the Government Printing Office during the year the bound edition of the Annual Report and Bulletin for 1907 and 13 documents issued in pamphlet form. Reprints of 6 documents, mostly relating to fish-cultural subjects, were required to meet current requests for such information.

There is an active and widespread demand for the publications of the Bureau, many of which contain practical instructions for persons engaging in fish culture, in commercial fishing, in the preservation of fishery products, and in other branches of the industry. During the year 23,000 documents have been forwarded in response to specific requests and 7,500 additional have been sent to libraries, societies, educational institutions, and specialists at home and abroad whose names are on the permanent mailing list.

The library of the Bureau is strictly technical, and is maintained for the use of the office staff, the laboratories and stations, and outside collaborators. The accessions in 1909 numbered about 450. By exchange, the library receives all the fishery publications of foreign governments and societies, as well as those of the States and local organizations.

APPROPRIATIONS.

The resources of the Bureau for the fiscal year 1909 were $840,100, including a number of special appropriations; of this amount there was turned back into the Treasury from the annual appropriations an unexpended balance of $23,302.35. In accordance with law, the detailed expenditures under the different items will be reported to Congress. The appropriations were as follows:

Salaries:	
General	$305,820.00
Agents at Alaska salmon fisheries	4,500.00
Agents at seal fisheries	11,430.00
Miscellaneous expenses:	
Administration	8,000.00
Propagation of food fishes	275,000.00
Inquiry respecting food fishes	30,000.00
Statistical inquiry	7,500.00
Maintenance of vessels	70,000.00
Supplies for native inhabitants of Alaska on the seal islands	19,500.00
Specials:	
Repairs for steamer *Albatross*	18,000.00
Purchase of steam vessel for Alaska salmon inspection service	20,000.00
Establishment of a biological station in the Mississippi Valley	25,000.00
Construction and repair of buildings and other improvements for stations at—	
Baird, Cal	850.00
Duluth, Minn	9,000.00
Leadville, Colo	7,500.00
Construction and repair of buildings and other improvements, and purchase of land for stations at—	
Mammoth Spring, Ark	12,000.00
Erwin, Tenn	9,000.00
Cape Vincent, N. Y	7,000.00

RECOMMENDATIONS.

SALARIES.

In the estimate for appropriations required for the conduct of the work of the Bureau for the fiscal year beginning July 1, 1910, provision is made for the elimination of 5 low-grade clerkships and the substitution therefor of one senior clerk at $2,100 per annum, one at $1,980 per annum, and one at $1,800, thus leaving $900 per

annum as the minimum clerical pay. This will afford an opportunity to advance competent and deserving employees to grades in which they will receive salaries commensurate with the duties required and performed. It is further provided that the salaries of assistants in charge of divisions, chief clerk, superintendent of car and messenger service, two scientific assistants, and firemen and messengers be raised. These increases are in line with those proposed in the report of the Committee on Grades and Salaries transmitted to Congress by the President on February 11, 1908, and aggregate $9,820; and it is earnestly hoped that they will be granted, as thereby the efficiency of the service will be greatly enhanced. It is recommended also that the salaries of all seamen be advanced from $540 to $600 per annum; the pay of these employees is regarded as most inadequate, particularly as they are obliged to meet mess bills out of their salaries, thus leaving such a small balance that good, reliable men are not attracted to the service. The foregoing increases are more than offset by reductions in the estimates for construction work and miscellaneous expenses, so that the aggregate appropriations asked for 1911 are $32,640 less than were received for 1910.

In connection with this request for increases in salaries, the Commissioner desires to express his appreciation of the efficient and faithful service performed by officials and employees. The progress that has been made and the high standard that has been maintained in all branches of the work are directly due to the intelligent and zealous efforts of the Bureau's staff at headquarters and in the field.

EXTENSION OF FISH-CULTURAL WORK.

Notwithstanding the present magnitude of the fish-cultural operations of the Bureau, there is necessity for a substantial increase, in order that certain important sections may participate more thoroughly in the beneficial work of the federal fishery service and in order that the yearly augmented demands for food and game fishes may be met. The recomendations under this head in the last report are therefore renewed. There should be provided additional hatcheries in the Mississippi Valley and there should be a marked extension of the work of saving fishes from the overflowed lands in the same region. Recent experience has shown that in the southeastern part of Missouri the conditions are favorable for the establishment of a combination station for cultivation of pond fishes and for the rescue of fishes from the bayous and ponds that become dry each year. The previous recommendation for a fish-cultural experiment station is likewise resubmitted.

NEW OFFICE BUILDING.

The recommendation for a new building for the accommodation of the Bureau's offices in Washington is urgently renewed and emphasized. The present obsolete, unsuitable, cramped, unsafe, and unsightly quarters interfere with efficient administration and retard progress along important lines. Besides office quarters, there are required laboratory facilities, proper storage for collections, and a modern public aquarium which, while serving a most useful purpose in connection with the experimental work of the Bureau, would be one of the chief educational attractions of Washington.

Respectfully,

GEO. M. BOWERS,
Commissioner.

To Hon. CHARLES NAGEL,
Secretary of Commerce and Labor.

THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1909

Bureau of Fisheries Document No. 728

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THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1909.

CHARACTER OF THE WORK.

More than 95 per cent of the output of the fish-cultural stations consists of important commercial species, notably the salmons, shad, whitefish, pike perch, yellow perch, white perch, lake trout, cod, pollock, flatfish, and lobsters. These are hatched in lots of many millions annually and planted by the Bureau, the fresh-water species principally in the large coastal streams and in the Great Lakes, the marine species upon the inshore fishing grounds of the Atlantic.

The cultivation of the fishes of the interior waters generally classed as game fishes, although a comparatively small factor in the total output, is a very important feature of the Bureau's work, supplying as it does various kinds of young fish for public streams, lakes and ponds, fishing preserves, private ponds, streams, etc., in all parts of the United States. Among the fishes most extensively cultivated for these purposes are the landlocked salmon, several species of trout, the grayling, the basses, crappie, bream, and catfish; various others also are handled. The trouts are artificially hatched from eggs taken from both wild and domesticated stock; the basses, catfish, and others are derived from mature fish held in ponds for breeding purposes, or (except the small-mouth black bass) they are rescued from the overflows of the Mississippi and Illinois rivers. Collections from the latter sources include also pike and pickerel, which are not distributed to applicants but are returned immediately to the main streams.

METHOD OF DISTRIBUTION.

The first consideration in the Bureau's distribution of fishes is to make ample return to the waters from which eggs or fish have been collected. The remainder of the product is consigned to suitable public or private waters upon application indorsed by a United States Senator or Representative, the Bureau furnishing to persons interested an application blank for this purpose. The blank calls for a description of the waters to be stocked, and by this information

is determined the species of fish that is suitable and the number that may be allotted to the water area in question. Certain predaceous species, such as the basses, perches, and pickerel, are not furnished for waters inhabited by trout or other valuable fishes to which they would be destructive. Nor, of course, are species like trout and salmon furnished for waters already stocked with fish that would prey upon them.

The fish are carried to their destination in railroad cars equipped for the purpose, or by messengers who accompany the shipments in baggage cars, and are delivered to the applicant free of charge, at the railroad station nearest the point of deposit. The applicant is advised by telegraph when the shipment will arrive, and is expected to make due provision for care of the fish until planted. Definite instructions in this respect are furnished at the time of shipment.

During the past fiscal year (July 1, 1908, to June 30, 1909) the Bureau received 10,112 applications for fish, nearly all for the game species. The demand, especially for the basses, crappie, and the catfish, has for some time been greater than could be met with available resources. The number of applications this year was 1,828 more than in 1908.

SIZE OF FISH WHEN DISTRIBUTED.

Fishes are distributed at various stages of development, according to the species, the numbers in the hatcheries, and the facilities for rearing. The commercial fishes—such as the shad, whitefish, lake trout, pike, perch, cod, etc., hatched in lots of many millions—are necessarily planted as fry shortly after hatching. Atlantic salmon, landlocked salmon, and various species of trout are reared, in such numbers as the hatchery facilities permit, to fingerlings from 1 to 6 inches in length; the remainder are distributed as fry.[a]

The basses, bream, and other sunfishes are distributed from some three weeks after they are hatched until they are several months of age. When the last lots are shipped the basses usually range from 4 to 6 inches and the sunfishes from 2 to 4 inches in length. The numerous fishes collected in overflowed lands—basses, crappie, sun-

[a] The varying usage in the classification of young fish as to size has caused such confusion and difficulty that the Bureau has adopted uniform definitions, as follows:

Fry=fish up to the time the yolk sac is absorbed and feeding begins.

Advanced fry=fish from the end of the fry period until they have reached a length of 1 inch.

Fingerlings=fish between the length of 1 inch and the yearling stage, the various sizes to be designated as follows: No. 1, a fish 1 inch in length and up to 2 inches; no. 2, a fish 2 inches in length and up to 3 inches; no. 3, a fish 3 inches in length and up to 4 inches, etc.

Yearlings=fish that are 1 year old, but less than 2 years old from the date of hatching; these may be designated no. 1, no. 2, no. 3, etc., after the plan prescribed for fingerlings.

fishes, catfishes, yellow perch, and others—are 2 to 6 inches in length when taken and distributed.

Eggs are distributed only to state hatcheries and, occasionally, to applicants who have hatchery facilities.

SIZE OF ALLOTMENTS.

The Bureau does not attempt to furnish to any one applicant more than a brood stock of fish for a given private pond or stream, it being expected that these will be protected until they have had time to reproduce. The number of fish in an allotment is, however, a variable quantity, depending upon the species and the age at which distributed. Brook trout, which are distributed both as fry and fingerlings, are allotted in much larger numbers as fry than as fingerlings 3 or 4 inches long. Pike perch, which, owing to there excessive cannibalism, can not be reared and are consequently distributed as fry, may be supplied in lots of half a million, where an equal water area would receive only 200 or 300 young bass from 2 to 5 inches long. These latter larger fish have a much better chance of reaching maturity than have the fry, and the actual value for stocking purposes of a few hundred fingerling bass may therefore equal many thousand times this number of pike perch fry.

SPECIES CULTIVATED IN 1909.

The species cultivated by the Bureau in 1909 numbered some 50 fishes and the lobster. Of these the following were artificially propagated:

THE CATFISHES (SILURIDÆ):

Horned pout, bullhead, yellow cat (*Ameiurus nebulosus*).
Marbled cat (*Ameiurus nebulosus marmoratus*).

THE SHADS AND HERRINGS (CLUPEIDÆ):

Shad (*Alosa sapidissima*).

THE SALMONS, TROUTS, WHITEFISHES, ETC. (SALMONIDÆ):

Common whitefish (*Coregonus albus* and *C. clupeaformis*).
Lake herring, cisco (*Argyrosomus artedi*).
Chinook salmon, king salmon, quinnat salmon (*Oncorhynchus tschawytsha*).
Silver salmon, coho (*Oncorhynchus kisutch*).
Blueback salmon, redfish, sockeye (*Oncorhynchus nerka*).
Humpback salmon (*Oncorhynchus gorbuscha*).
Steelhead trout, hardhead (*Salmo gairdneri*).
Rainbow trout (*Salmo irideus*).
Atlantic salmon (*Salmo salar*).
Landlocked salmon (*Salmo sebago*).
Yellowstone Lake trout, cutthroat trout, blackspotted trout (*Salmo lewisi*).
Golden trout (*Salmo roosevelti*). Distribution not yet undertaken.
Sea trout (*Salmo trutta*). Introduced species.
Loch Leven trout (*Salmo trutta levenensis*). Introduced species, propagated in limited numbers for observation under natural conditions.
Lake trout, Mackinaw trout, longe, togue (*Cristivomer namaycush*).
Brook trout, speckled trout (*Salvelinus fontinalis*).
Sunapee trout (*Salvelinus aureolus*).

The graylings (Thymallidæ):
Montana grayling (*Thymallus montanus*).
The basses, sunfishes, and crappies (Centrarchidæ):
Crappie (*Pomoxis annularis*).
Strawberry bass, calico bass (*Pomoxis sparoides*).
Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
Warmouth, goggle-eye (*Chænobryttus gulosus*).
Small-mouth black bass (*Micropterus dolomieu*).
Large-mouth black bass (*Micropterus salmoides*).
Bream, bluegill sunfish (*Lepomis pallidus*).
Other sunfishes, chiefly *Eupomotis gibbosus*.
The perches (Percidæ):
Pike perch, wall-eyed pike, yellow pike, blue pike (*Stizostedion vitreum*).
Yellow perch, ring perch (*Perca flavescens*).
The sea basses (Serranidæ):
Striped bass, rockfish (*Roccus lineatus*).
White bass (*Roccus chrysops*).
White perch (*Morone americana*).
Yellow bass (*Morone interrupta*).
The smelts (Argentinidæ):
American smelt (*Osmerus mordax*).
The cods (Gadidæ):
Cod (*Gadus callarias*).
Pollock (*Pollachius virens*).
The flounders (Pleuronectidæ):
Winter flounder, American flatfish (*Pseudopleuronectes americanus*).
Crustaceans:
American lobster (*Homarus americanus*).

After the annual seasons of high water in the Mississippi basin, great numbers of young fish are left in sloughs and pools when the waters have receded, and would eventually die by the drying up of these shallow places in summer or freezing in winter. Large collections are made from such sources, for return to the original streams and, of the most abundant species, also to supplement the hatchery stock for distribution. The fishes so collected in 1909 were as follows:

The Catfishes (Siluridæ):
Spotted cat, blue cat, channel cat (*Ictalurus punctatus*). Only limited numbers obtainable.
Horned pout, bullhead, yellow cat (*Ameiurus nebulosus*).
The Suckers and Buffalofishes (Catostomidæ):
Small-mouth buffalofish (*Ictiobus bubalus*).
The Minnows and Carps (Cyprinidæ):
Carp (*Cyprinus carpio*). Distributed in rare instances, for waters unsuited to other species.

The pikes and pickerels (Esocidæ):
Pike (*Esox lucius*). Restored to the streams; not distributed.
Pickerel (*Esox reticulatus*). Restored to the streams; not distributed.
The Basses, Sunfishes, and Crappies (Centrarchidæ):
Crappie (*Pomoxis annularis*).
Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
Warmouth, goggle-eye (*Chænobryttus gulosus*).
Large-mouth black bass (*Micropterus salmoides*).
Bream, bluegill sunfish (*Lepomis pallidus*).
Other sunfishes (chiefly *Eupomotis gibbosus*).
The Perches (Percidæ):
Yellow perch, ring perch (*Perca flavescens*).
The croakers (Sciænidæ):
Fresh-water drum, sheepshead, gaspergou (*Aplodinotus grunniens*). Only limited numbers obtainable. Not distributed.

Certain introduced species are propagated to a limited extent, as follows:

The minnows and carps (Cyprinidæ):
Goldfish (*Carassius auratus*). Propagated for ornamental purposes; not distributed.
Tench (*Tinca tinca*). Cultivated varieties, green tench and golden tench. Propagated for ornamental purposes; not distributed.
Ide (*Leuciscus idus*). Cultivated variety, golden ide. Propagated for ornamental purposes; not distributed.

OUTPUT.

SUMMARIZED STATEMENT.

The fish-cultural work of the Bureau during the fiscal year 1909 attained its highest record, with an output of 3,107,131,911. Of this number 2,382,573,208 were young fish, distributed for the stocking and replenishing of public and private waters, and the remaining 724,558,703 were eggs, delivered to state and foreign hatcheries. The output of young fish exceeds the greatest previous record for any one year by over 611,000,000.

Flatfish, pike perch, blueback salmon, white perch, lake, black-spotted, and steelhead trouts, landlocked salmon, bream, crappie, small-mouth bass, and rock bass show the largest increases over last year. The number of yellow perch, shad, Atlantic salmon, and rainbow trout was smaller than in the preceding year, but the decrease was a normal one.

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR ENDED JUNE 30, 1909.

Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Total.
Catfish			562,580	562,580
Carp			7,807	7,807
Buffalofish			57,400	57,400
Shad	266,000	57,112,000		57,378,000
Whitefish	142,220,000	277,445,000		419,665,000
Chinook salmon	38,859,265	20,177,286	75,429	59,111,980
Silver salmon	272,000	9,470,925		9,742,925
Blueback salmon	100,000	93,409,496		93,509,496
Humpback salmon		10,000	100	10,100
Steelhead trout	271,468	2,181,413	46,500	2,499,381
Rainbow trout	286,150	292,408	2,026,463	2,605,021
Atlantic salmon		647,790	24,435	672,225
Landlocked salmon	570,000	793,550	237,896	1,601,446
Blackspotted trout	602,820	5,993,943	2,049,395	8,646,158
Loch Leven trout			70,000	70,000
Lake trout	22,806,000	27,188,177	1,345,100	51,339,277
Brook trout	905,000	5,821,322	3,723,489	10,449,811
Sunapee trout		229,736		229,736
Scotch sea trout			47	47
Grayling	350,000	808,000	6,032	1,164,032
Pike			44,200	44,200
Crappie and strawberry bass		62,500	217,355	279,855
Rock bass			51,112	51,112
Warmouth bass			2,278	2,278
Small-mouth black bass		262,674	111,924	374,598
Large-mouth black bass		32,500	540,962	573,462
Sunfish			317,888	317,888
Pike perch	457,850,000	187,050,000		644,900,000
Yellow perch	10,000,000	213,610,410	50,873	223,661,283
Striped bass		4,518,000		4,518,000
White perch	24,500,000	318,760,000	2,650	343,262,650
Yellow bass		136,938	1,225	138,163
Smelt	24,700,000	9,400,000		34,100,000
Freshwater drum			25,000	25,000
Cod		153,536,000		153,536,000
Flatfish		786,626,000		786,626,000
Pollock		30,890,000		30,890,000
Lobster		164,509,000		164,509,000
Total	724,558,703	2,370,975,068	11,598,140	3,107,131,911

WORK AND OUTPUT OF THE STATIONS.

The following tabulation lists all of the stations operated by the Bureau in 1909, and shows for each the period of operation, the kinds of fishes handled, and the number of fish and eggs produced. It shows also the character of the work in each locality and in some degree the relative importance of the stations, the latter statement being qualified for particular instances. Some substations are more important in the actual fish-cultural work than are the stations to which they are, for purposes of administration, subordinate; but the output of these important substations is not always shown separate from that of the main hatchery. Distinctions are indicated to some extent in the table by means of a scheme of type: All of the stations and all of the substations where eggs were hatched are printed in ordinary roman type, with marginal indentions to show their relative administrative status; substations which were merely collecting points, perhaps shifting in location from year to year, are printed in italics, and their output is ordinarily included with the output of that species credited to the main station. The transfers of eggs and fish from station to station are recorded in foot-

notes under the station from which taken, and the yield is credited to the receiving station. Transfers of eggs are frequent, serving convenience and economy in transportation to stations which are to be distributing centers for the respective species, since the shipment of eggs is easier and cheaper than the shipment of young fish.

STATIONS OPERATED AND THE OUTPUT OF EACH.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Afognak, Alaska	Entire year	Blueback salmon		39,325,870	
		Humpback salmon		10,000	
Baird, Cal.[a]	do	Chinook salmon	5,078,065	3,590,078	
Battle Creek, Cal.	Oct. 1–Jan. 30	do	14,006,550		
Mill Creek, Cal.	do	do	13,193,650		
Yreka, Cal.[a]	Jan. 1–Apr. 12	Rainbow trout			
Baker Lake, Wash.[a]	Entire year	Chinook salmon		193,780	
		Blueback salmon		5,384,726	
		Silver salmon		5,867,460	
Birdsview, Wash.[a]	do	Chinook salmon		200.758	
		Blueback salmon	100,000	45,900	
		Silver salmon	272,000	1,793,650	
		Steelhead trout	220,000	717,691	
		Brook trout		38,000	
Salmon Banks, Blaine, Wash.	July 29–Oct. 15	Blueback salmon			
Battery, Havre de Grace, Md.	Feb. 20–June 5	Shad		4,843,000	
		Yellow perch		67,843,000	
		White perch	24,500,000	312,260,000	
Boothbay Harbor, Me.	Entire year	Lobster		130,255,000	
		Cod		10,305,000	
		Flatfish		182,070,000	
Portland, Me.	July 1–Dec. 31; May 1–June 30.	Lobster			
York, Me.	July 1–Sept. 30	do			
Bozeman, Mont.	Entire year	Brook trout			154,700
		Rainbow trout			17,300
		Steelhead trout			1,000
		Grayling	350,000	808,000	6,032
		Blackspotted trout			558,500
		Golden trout			
		Landlocked salmon			9,000
Red Rock, Mont.	Apr. 1–June 30	Grayling			
Bryans Point, Md.	Feb. 23–May 27	Shad		12,658,000	
		Yellow perch		129,942,610	
Cape Vincent, N. Y.	Entire year	Whitefish		19,870,000	
		Pike perch		15,700,000	
		Yellow perch		500,000	
		Rainbow trout		4,500	
		Brook trout		899,000	
		Lake trout		3,190,000	
Central Station and aquaria, Washington, D. C.[a]	do	Rainbow trout		17,800	
		Brook trout		13,600	
		Whitefish		775,000	
		Pike perch		8,500,000	
		Chinook salmon			16,560
		Shad		168,000	
		Small-mouth black bass.			3,009
		Large-mouth black bass.			225
		Rock bass			2,525
		Warmouth bass			550
		Crappie			960
		Bream			22,800
		Catfish			525
		Yellow perch		3,700,000	250
		White perch		6,500,000	2,650

[a] For convenience in handling, the following transfers were made:
Baird to Central Station, 14,000 chinook salmon eggs.
Yreka substation to Clackamas, 100,000 rainbow trout eggs.
Baker Lake to other stations, 20,000 chinook salmon eggs, 110,000 silver salmon eggs, and 110,000 blueback salmon eggs.
Birdsview to other stations, 292,000 steelhead trout eggs.
Central Station to Nashua, 15,000 chinook salmon fingerlings.

STATIONS OPERATED AND THE OUTPUT OF EACH—Continued.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Clackamas, Oregon City, Oreg.[a]	Entire year	Steelhead trout		119,831	
		Blackspotted trout		178,000	50
		Rainbow trout		37,000	
		Brook trout		52,000	
		Chinook salmon		3,010,195	2,763
		Shad		349,000	
Big White Salmon, Wash.	Aug. 15–Feb. 28	Chinook salmon		5,244,015	
Cazadero, Oreg.[a]	Entire year	do	3,531,000	1,239,750	
		Silver salmon		1,156,915	
		Steelhead trout	50,000	315,000	
Eagle and Tanner creeks, Columbia River, Oreg.[a]	Aug. 15–Nov. 12	Chinook salmon			
Eagle Creek, Clackamas River, Oreg.	May 1–June 30	Steelhead trout		60,630	
Findley Eddy, Rogue River, Oreg.[a]	July 1–Nov. 23	Chinook salmon			
Illinois River, Rogue River, Oreg.[a]	July 15–Dec. 31	do			
Little White Salmon, Wash.	Entire year	do	3,050,000	5,927,000	14,186
Rogue River	do	Blackspotted trout	420	21,705	
		Steelhead trout	1,468	878,847	
		Chinook salmon		771,710	
		Silver salmon		643,000	
Willamette River, Oreg.	June 17–July 8	Shad		740,000	
Cold Springs, Bullochville, Ga.	Entire year	Large-mouth black bass.			138,015
		Bream			13,100
		Catfish			13,200
		Carp			20
		Warmouth bass			1,728
Craig Brook, East Orland, Me.[a]	do	Brook trout		331,000	109,244
		Scotch sea trout			47
		Landlocked salmon			2,856
		Chinook salmon			100
		Atlantic salmon		647,790	24,435
		Humpback salmon			100
Upper Penobscot, Staceyville, Me.	Oct. 15–June 30	Atlantic salmon			
Duluth, Minn.	Entire year	Brook trout			262,800
		Steelhead trout			45,500
		Pike perch		16,500,000	
		Lake trout	50,000	7,760,000	1,252,000
		Whitefish		19,800,000	
Isle Royal, Mich.	Oct. 25–Nov. 16	Lake trout			
Keweenaw Point, Mich.	Oct. 3–Nov. 3	do			
Marquette, Mich.	Oct. 14–Nov. 7	do			
Ontonagon, Mich.	Oct. 14–Nov. 6	do			
Rossport, Ont.	Sept. 20–Oct. 13	do			
Edenton, N. C.	Feb. 3–May 21	Shad	266,000	38,354,000	
Weldon, N. C.	Apr. 1–May 20	Striped bass		4,518,000	
Erwin, Tenn.[a]	Entire year	Rainbow trout			472,250
		Brook trout			241,576
		Small-mouth black bass.			1,600
		Rock bass			450
		Large-mouth black bass.		26,000	21,250
		Bream			11,625
		Catfish			144
Gloucester, Mass.	do	Lobster		13,990,000	
		Cod		80,300,000	
		Pollock		30,890,000	

[a] For convenience in handling the following transfers were made:
Clackamas to the exposition, Seattle, Wash., 225 chinook salmon fingerlings.
Cazadero to exposition, Seattle, 53,000 steelhead trout eggs.
Eagle and Tanner creeks to Clackamas, 742,600 chinook salmon eggs; Eagle Creek to other stations, 166,780 steelhead trout eggs; Willamette to exposition, Seattle, 350,000 shad eggs.
Findley Eddy to Rogue River, 292,100 chinook salmon eggs.
Illinois River station to Rogue River, 332,870 chinook salmon eggs.
Craig Brook to Green Lake, 11,500 brook trout fingerlings.
Erwin to Wytheville, 5,000 brook trout fingerlings and 650 rock bass.

STATIONS OPERATED AND THE OUTPUT OF EACH—Continued.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Gloucester, Mass	Entire year	Flatfish		218,090,000	
Boston, Mass	July 1–July 11; Apr. 15–June 30.	Lobster			
Plymouth, Mass	Dec. 27–Mar. 16	Cod			
Portsmouth, N. H.	Apr. 6–June 30	Lobster			
Green Lake, Me.[a]	Entire year	Landlocked salmon	90,000	310,225	195,850
		Brook trout		827,500	
		Lake trout		450,000	
		Rainbow trout		7,400	
		Smelt	24,700,000	9,400,000	
Branch Pond, Me.	Sept. 11–Nov. 27	Landlocked salmon			
		Brook trout			
Grand Lake Stream, Me.[a]	Entire year	Landlocked salmon	480,000	442,290	28,570
		Brook trout		42,437	
Leadville, Colo.[a]	do	Rainbow trout	16,150	213,200	225,400
		Brook trout	860,000	1,582,000	366,230
		Lake trout			48,000
		Blackspotted trout	280,000	3,366,500	
Cheesman Lake, Colo.	Apr. 13–May 16	Rainbow trout			
Edith Lake, Colo.	Oct. 25–Nov. 29	Brook trout			
Engelbrecht's lake, Colo.	Oct. 18–Nov. 15	do			
Grand Lake, Colo.	July 25–Aug. 31	Blackspotted trout			
		Rainbow trout			
Grand Mesa Lakes, Colo.	July 1–Aug. 10	Blackspotted trout			
	Oct. 10–Oct. 25	Brook trout			
	June 2–June 30	Rainbow trout			
Miklich Lake, Colo.	Nov. 19–Dec. 5	Brook trout			
Musgrove's lake, Colo.	Oct. 10–Nov. 23	do			
Ridgway's lake, Colo.	Nov. 20–Dec. 5	do			
Ridgway-Miklich lake, Colo.	Feb. 24	Rainbow trout			
Twin Lakes, Colo.	Nov. 1–Nov. 24	Brook trout			
Wellington Lake, Colo.	Oct. 23–Dec. 4	do			
Zoeble's lake, Colo.	Nov. 6–Nov. 13	do			
Mammoth Spring, Ark.[a]	Entire year	Small-mouth black bass.			58,150
		Large-mouth black bass.			19,700
		Rock bass			2,300
Des Arc, Ark.	Mar. 1–Apr. 30	Yellow bass		136,938	
		Crappie		62,500	
Manchester, Iowa[a]	Entire year	Rainbow trout	50,000		278,500
		Brook trout			773,360
		Lake trout			15,100
		Small-mouth black bass.			5,231
		Rock bass			1,125
		Pike perch		2,450,000	
		Crappie			16
La Crosse, Wis.[b]	July 1–Nov. 20	Large-mouth black bass.			123,750
		Crappie			69,220
		Rock bass			1,500
		Bream			30,108
		Pike			17,200
		Catfish			135,580
		Yellow perch			4,550
		Buffalofish			27,000
North McGregor, Iowa[b]	Aug. 3–Oct. 9	Large-mouth black bass.			103,225
		Rock bass			400
		Crappie			72,525
		Bream			59,675
		Catfish			121,300
		Buffalofish			30,200
		Yellow perch			45,000
		Pike			27,000
		Freshwater drum			25,000

[a] For convenience in handling, the following transfers were made:
Green Lake to Nashua, 30 landlocked salmon yearlings, and 4,000 landlocked salmon fingerlings.
Grand Lake Stream to other stations, 408,381 landlocked salmon eggs.
Leadville to other stations, 225,000 brook trout eggs.
Mammoth Spring to Quincy, 193 small-mouth black bass fingerlings.
Manchester to other stations, 7,700 large-mouth black bass, 2,900 catfish, 4,105 rock bass, 1,200 rainbow trout, 400 brook trout, 100 crappie, and 1,272 yellow perch, all fingerlings.

[b] Station for the collection of fishes from overflowed lands.

STATIONS OPERATED AND THE OUTPUT OF EACH—Continued.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Nashua, N. H.[a]	Entire year	Brook trout		482,000	77,100
		Rainbow trout		12,508	
		Lake trout		176,136	
		Landlocked salmon		14,432	1,620
		Small-mouth black bass.		19,400	
		Chinook salmon			43,195
		Sunapee trout		229,736	
Lake Sunapee, N. H.	Sept. 15–Nov. 15	Brook trout			
		Sunapee trout			
Neosho, Mo.[a]	Entire year	Rainbow trout			216,200
		Pike perch		200,000	
		Crappie and strawberry bass.			4,825
		Small-mouth black bass.			2,400
		Large-mouth black bass.			5,100
		Rock bass			20,700
		Bream			10,480
Northville, Mich.[a]	do	Small-mouth black bass.			39,790
		Lake trout	22,756,000	357,500	30,000
		Brook trout		366,000	113,313
		Steelhead trout		21,000	
		Loch Leven trout			
Alpena, Mich.	Feb. 23–May 22	Whitefish		20,000,000	
		Lake trout		4,500,000	
Charlevoix, Mich.	Nov. 4–Nov. 28	do		4,340,000	
	Mar. 11–May 1	Whitefish		20,000,000	
Detroit, Mich.[a]	Entire year	Pike perch	50,000,000	45,350,000	
		Whitefish	1,100,000	38,000,000	
Algonac, Mich.	May 1–May 26	Pike perch			
Bay City, Mich.	Apr. 1–Apr. 28	do			
Belle Isle, Mich.	Oct. 21–Dec. 5	Whitefish			
Grassy Island, Mich.	Oct. 27–Nov. 28	do			
Lake George, Mich.	Dec. 3–Dec. 17	do			
Manistique, Mich.	Nov. 4–Nov. 28	Lake trout			
St. James, Mich.	do	do			
	Dec. 4–Dec. 17	Whitefish			
Sault Ste. Marie, Mich.	Mar. 1–May 30	do		20,000,000	
		Lake trout		6,000,000	
Put-in-Bay, Ohio[a]	Entire year	Whitefish	141,120,000	139,000,000	
		Pike perch	407,850,000	79,750,000	
		Lake trout		343,000	
		Yellow perch		10,000,000	
Kelleys Island, Ohio	Nov. 12–Dec. 3	Whitefish			
Middle Bass, Ohio	Nov. 11–Nov. 30	do			
Monroe, Mich.	Nov. 3–Dec. 3	do			
	Apr. 5–Apr. 28	Pike perch			
North Bass. Ohio	Nov. 11–Dec. 3	Whitefish			
	Apr. 20–May 18	Pike perch			
		Yellow perch			
Port Clinton, Ohio	Nov. 6–Dec. 3	Whitefish			
	Apr. 5–Apr. 28	Pike perch			
Toledo, Ohio	Apr. 5–Apr. 30	do			
Quincy, Ill.[a]	Entire year	(Office headquarters)			
Meredosia, Ill.[a]	July 1–Dec. 31	Yellow perch			3,200
	May 10–May 14	Pike perch		5,000,000	
		Carp			7,712
		Large-mouth black bass.			44,800
		Crappie			62,955
		Buffalofish			200
		Catfish			302,800
		Bream			147,971

[a] For convenience in handling, transfers were made as follows:
Nashua to Craig Brook station 6,233 brook trout eggs.
Neosho to other stations, 35,220 rock bass, 3,000 crappie, and 2,420 bream, all fingerlings.
Northville to other stations, 29,360,000 lake trout eggs.
Detroit to other stations, 60,500,000 whitefish eggs and 32,800,000 pike perch eggs.
Put-in-Bay to other stations, 50,576,000 whitefish eggs and 37,600,000 pike perch eggs.
Quincy to other stations, 7,450 catfish fingerlings, 50 black bass fingerlings, and 350 crappie fingerlings.
Meredosia to Neosho, 150 black bass fingerlings and 750 catfish fingerlings; to Quincy, 14,325 crappie fingerlings. The principal work at the Meredosia station is the collection of fishes from overflowed lands.

STATIONS OPERATED AND THE OUTPUT OF EACH—Continued.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
St. Johnsbury, Vt.[a]	Entire year	Small-mouth black bass.		177,774	2,150
		Lake trout		87,041	
		Brook trout	45,000	1,156,305	
		Landlocked salmon		31,013	
		Steelhead trout		68,414	
Arlington, Vt.[a]	July 1–Sept. 30	Brook trout			229,000
Chittenden, Vt.	July 14–Dec. 7	do			
Darling Pond, Groton, Vt.	Sept. 10–Dec. 22	do			
Holden, Vt.	Apr. 12–June 30	Brook trout			
		Lake trout			
		Landlocked salmon			
Lake Mitchell, Sharon, Vt.	Sept. 2–Dec. 19	Brook trout			
Swanton, Vt.[a]	Mar. 18–June 10	Pike perch		13,600,000	
		Yellow perch	10,000,000	1,624,800	
San Marcos, Tex.	Entire year	Large-mouth black bass.			78,946
		Rock bass			6,579
		Crappie and strawberry bass.			5,060
		Bream			6,575
		Catfish			30
Spearfish, S. Dak.[a]	do	Brook trout		100,000	682,550
		Rainbow trout			146,900
		Blackspotted trout	322,400	2,490,000	1,492,575
		Lock Leven trout			70,000
Schmidt's lake, S. Dak.	Oct. 25–Dec. 31	Brook trout			
Thumb of the Lake. Yellowstone Park.	May 25–Aug. 1	Blackspotted trout			
Cub Creek, Yellowstone Park.	June 10–Aug. 10	do			
Tupelo, Miss.	Entire year	Crappie			9,650
		Bream			22,350
		Catfish			1,200
		Large-mouth black bass.			19,350
		Yellow bass			1,225
White Sulphur Springs, W. Va.[a]	do	Brook trout			518,880
		Rainbow trout			250,873
		Blackspotted trout			70
		Small-mouth black bass.		59,000	2,140
		Large-mouth black bass.			29
Woods Hole, Mass.	do	Cod		62,931,000	
		Flatfish		386,466,000	
		Lobster		20,264,000	
Chilmark, Mass.	May 15–June 30	do			
East Greenwich, R. I.	Mar. 1–Apr. 14	Flatfish			
Gay Head, Mass.	May 15–June 30	Lobster			
Gosnold, Mass.	do	do			
Nantucket, Mass.	do	do			
Newport, R. I.	Mar. 8–Apr. 5	Flatfish			
Noank, Conn.	Oct. 15–Oct. 31	Lobster			
Plymouth, Mass.	Nov. 20–Mar. 26	Cod			
Sandwich, Mass.	May 15–June 30	Lobster			
Waquoit, Mass.	Jan. 21–Apr. 3	Flatfish			
Westport, Mass.	May 15–June 30	Lobster			
West Tisbury, Mass.	do	do			
Warmouth, Mass.	do	do			

[a] For convenience in handling, the following transfers were made:
St. Johnsbury to other stations, 15,000 brook trout eggs, 250,000 brook trout fry, 5,000 landlocked salmon fry, and 5,000 lake trout fry.
Arlington to St. Johnsbury, 15,000 brook trout fingerlings.
Swanton to St. Johnsbury, 1,700,000 yellow perch eggs.
Spearfish to other stations, 1,400,000 blackspotted trout eggs and 5,000 rainbow trout fingerlings.
White Sulphur Springs to Wytheville, 8,000 brook trout fingerlings.

STATIONS OPERATED AND THE OUTPUT OF EACH—Continued.

Station.	Period of operation.	Species handled.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wytheville, Va.[a]	Entire year	Rainbow trout	220,000		434,965
		Brook trout			214,700
		Carp			105
		Pike perch		500,000	
		Large-mouth black bass.		6,500	7,084
		Rock bass			21,585
		Bream			175
		Small-mouth black bass.		6,500	120
Yes Bay, Alaska	do	Blueback salmon		48,653,000	
		Silver salmon		9,900	

[a] For convenience in handling, there were transferred from Wytheville to other stations 562,000 rainbow trout eggs, 30 carp, 8,000 rainbow trout fingerlings, and 19,550 rock bass fingerlings.

ALLOTMENTS TO STATE FISH COMMISSIONS.

As usual, various state fish commissions were supplied from the Bureau's stock with eggs to be hatched and distributed under their respective auspices. Following is a record of such allotments in 1909:

ALLOTMENTS OF FISH EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR ENDED JUNE 30, 1909.[a]

State and species.	Eggs.	State and species.	Eggs.
California:		New York—Continued.	
Chinook salmon	32,039,265	Landlocked salmon	30,000
Connecticut:		Rainbow trout	20,000
Lake trout	300,000	Blackspotted trout	25,000
Brook trout	30,000	Ohio:	
White perch	5,000,000	Pike perch	158,725,000
Yellow perch	10,000,000	Whitefish	55,548,000
Illinois:		Oregon:	
Rainbow trout	50,000	Chinook salmon	6,581,000
Whitefish	7,000,000	Brook trout	310,000
Pike perch	25,000,000	Blackspotted trout	100,000
Maine:		Steelhead trout	50,000
Landlocked salmon	300,000	Pennsylvania:	
Brook trout	300,000	Pike perch	223,125,000
Maryland:		Lake trout	3,000
Rainbow trout	50,000	Blackspotted trout	25,000
White perch	2,000,000	Silver salmon	75,000
Massachusetts:		Whitefish	58,572,000
Rainbow trout	50,000	Vermont:	
Michigan:		Lake trout	400,000
Landlocked salmon	30,000	Washington:	
Lake trout	3,500,000	Steelhead trout	50,000
Pike perch	50,000,000	Wisconsin:	
Smelt	22,500,000	Lake trout	12,126,000
Nevada:		Whitefish	20,000,000
Steelhead trout	50,000	Wyoming:	
New Hampshire:		Grayling	350,000
Silver salmon	50,000	Brook trout	50,000
Landlocked salmon	50,000	Blackspotted trout	210,000
Lake trout	300,000	Landlocked salmon	10,000
New York:		Steelhead trout	60,000
White perch	12,350,000		
Lake trout	3,000,000		

[a] Also there were allotted to California 765 crappie and strawberry bass, 3,600 bream, and 240 yellow perch fingerlings, yearlings, and adults; to Colorado, 50,000 blackspotted trout fry; to Minnesota, 4,420 crappie and strawberry bass and 816 large-mouth black bass fingerlings, yearlings, and adults; and to New York, 200,000 brook trout fry.

In the collection of whitefish and pike perch eggs on Lake Erie the Bureau had the active cooperation of the Ohio and Pennsylvania fish commissions.

SHIPMENTS TO FOREIGN COUNTRIES.

In response to requests reaching the Bureau through the Department of State, fish ova to the number of 568,150 have been doated to foreign countries, as follows:

SHIPMENTS TO FOREIGN COUNTRIES DURING THE FISCAL YEAR 1909.

Country and species.	Number.	Country and species.	Number.
Argentina:		France:	
Blueback salmon	100,000	Brook trout	10,000
Brook trout	50,000	Lake trout	10,000
Chinook salmon	200,000	Germany:	
Lake trout	50,000	Rainbow trout	16,150
Landlocked salmon	15,000		
Rainbow trout	25,000	Total	568,150
Silver salmon	92,000		

Through the courtesy of the Canadian fishery authorities the Bureau, as heretofore, has maintained at Rossport, Ontario, as an adjunct of the Duluth (Minnesota) hatchery, a station for the collection of eggs of the lake trout.

DETAILS OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR 1909.

CATFISH.

Disposition.	Fingerlings, yearlings, and adults.	Disposition.	Fingerlings, yearlings, and adults.
Alabama:		Colorado:	
Altoona, Robbins's pool	100	Falcon, Falcon Lake	150
Bessemer, Seller's pond	100	Hermann's pond	150
Dothan, Wilson's pond	150	Greeley, Sheep Draw Reservoir	50
Fayette, Shirley's pond	100	Loveland, Sanborn Lake	50
Fort Payne, Wills Creek	300	Olathe, Uncompahgre River	200
Glen Allen, Abel's pond	200	Rifle, Grand River	200
Greenville, McFerrin's pond	150	Trinidad, Purgatory River	150
Livingston, Gould's pond	100	District of Columbia:	
Marion, Swann's pond	100	Central Station Aquarium, Washington	10
Normal, Turner's pond	250	Georgia:	
Opelika, Black Jack Lake	125	Athens, Bear Creek Pond	500
Ozark, Delony's pond	100	Barnesville, Hill Crest Pond	150
Pinckard, Borland Mill Pond	150	Bremen, Baskins's pond	125
Dean Mill Pond	150	Buena Vista, Tazewell Mill Pond	100
Freestone Pond	125	Bullochville, Williams's pond	200
Vance, Vance Pond	100	Canon, Agnew's pond	500
Winfield, White Hill Pond	400	Ray's pond	500
Yolande, Yolande Waterworks	100	Carrollton, Tallapoosa Reservoir	150
York, Shelton's pond	250	Cedartown, Big Cedar Creek	250
Arizona:		Chickamauga, Campbell's pond	150
Ash Fork, Stone Lake	150	Columbus, Uchee Lake	200
Benson, Harris and Fry's pond	50	Comer, McConnell's pond	500
Marvin's reservoir	50	Commerce, Oconee River	200
Vance's reservoir	50	Covington, Ramsey's pond	100
Douglas, Hanigan's pond	50	Spring Branch Pond	175
Tar Heel Lake	50	Crawford, Maxwell Pond	225
Pima, Bear Springs Pond	50	Crawfordsville, Chapman's pond	100
Safford, Allred's reservoir	50	Cuthbert, Bartlett's pond	150
Broshier's reservoir	50	Elberton, Beaverdam Creek	150
Sisson Reservoir	50	Broad River	1,000
Tombstone, Trappman's reservoir	100	Fairburn, Coleman's pond	140
Arkansas:		Russell's pond	500
Adona, Sharp's lake	200	Fairmont, Salacon Creek	200
Bellefonte, Weaver Pond	200	Flippen, Rowan's pond	150
Harrison, Burns's pond	200	Forsyth, Brooklyn Lake	200
Pocahontas, Spring Lake	100	Griffin, Towaliga Pond	150
St. Paul, Mountain Top Pond	50	Hamilton, Spencer's pond	140

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CATFISH—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Georgia—Continued.	
Hartwell, Savannah River	250
Heardmont, Savannah River	100
Hogansville, Denny's pond	140
Hull, Kemp's lake	100
McDonough, Thrasher's pond	150
Macon, Edward's pond	150
Midland, Jenkins's pond	140
McBride's pond	140
Middleton, Savannah River	100
Milner, Russell's pond	125
Morgan Falls, Chattahoochee Pond	100
Oglesby, Broad River	200
Rome, Hawkin's pond	100
Royston, Nails Creek Pond	325
Senoia, Sasser's pond	175
Wilson's pond	140
Sunnyside, Darsey's pond	150
Thomson, Boyd and Lewis's pond	150
Fulton Pond	200
Reese's pond	350
Warm Springs, Freestone Pond	140
Warrenton, Matthews Gin Pond	200
Willacoochee, Alapaha River	200
Vickers Pond	200
Idaho:	
Culdesac, Bishop's pond	150
Heyburn, Snake River	300
Kendrick, Spring Lake	150
Lenore, Gifford Pond	200
Green's pond	150
McCammon, Crooked Bed Pond	200
Market Lake, Cammas Creek	300
Meridian, Five-mile Creek	300
Parma, Parma Slough	300
Stites, Stites's pond	150
Whiskey Bills Pond	150
Troy, Little Bear Lake	200
Weiser, Weiser River	500
Illinois:	
Aurora, Fox River	7,500
Chatsworth, Ferrias's pond	1,750
Decatur, Sangamon River	13,100
Granville, Robinson's lake	1,750
Meredosia, Illinois River	216,300
Meredosia Bay	400
Momence, Kankakee River	5,000
Naperville, Du Page River	7,500
Pana, Clear Lake	1,750
Shelbyville, Kaskaskia River	13,100
Steeleville, Mount Pleasant Lake	100
Indiana:	
Albion, Dollar Lake	300
Indian Lake	200
Lower Long Lake	300
Upper Long Lake	300
Anderson, Meadow Brook Pond	100
Aurora, Lucern Lake	200
Brownsburg, White Lick Creek	250
Middleburg, Cass Lake	200
Richmond, Kelleys Pond	100
Ross, Robertson's pond	100
Scottsburg, Scottsburg Lake	200
Iowa:	
Algona, Armstrong's pond	200
Manchester, Maquoketa River	3,900
North McGregor, Mississippi River	60,000
Waterloo, Cedar River	900
Kansas:	
Eldorado, Sunnyside Pond	50
Garden City, Carter's pond	50
Harper, Boggs Lake	100
Hiawatha, Wolf Creek	300
Kingman, Wallace Pond	50
Lenora, Zahner's pond	200
Lyndon, Yates's pond	150
Marion, Reed's pond	50

Disposition.	Fingerlings, yearlings, and adults.
Kentucky:	
Auburn, Bailey's pond	150
Bracht, William's pond	100
Covington, Kuckle's pond	100
Cumberland Falls, Cumberland Falls Lake	100
Hodgenville, Edwards Pond	100
Howell's pond	100
Lake Kirk	200
Nolin River	500
Jeffersontown, Cave Hill Pond	100
Mayfield, Wade's lake	100
Paris, Bedford's ponds	200
Pembroke, Bland Pond	150
Levell's pond	125
Long Pond	200
Minor Pond	150
Prim Pond	125
Maryland:	
Brunswick, Potomac River	525
Massachusetts:	
East Bridgewater, Robbins Pond	215
Michigan:	
Allen, Carpenter Lake	250
Jackson, Michigan Center Pond	300
Morenci, Tiffin River	300
Portland, Grand River Pond	250
Minnesota:	
Brownsville, Mississippi River	58,500
Mississippi:	
Aberdeen, Scruggs Pond	200
Algona, Bost's pond	150
Berwick, Berwick Pond	200
Cotton Plant, Foley's pond	200
Decatur, Day's mill pond	50
Ecru, Holditch's pond	200
Egypt, Carlisle's pond	125
Guntown, Davidson's pond	100
Macon, Sunnyside Lake	125
Pontotoc, Austin's lake	200
Brown's pond	200
Carr's pond	200
Ridgeway Fishing Lake	200
Missouri:	
Brandsville, Niessen's pond	100
Columbia, Bass Lake	200
Exeter, Cole's pond	100
Joplin, Shore Creek	150
Mayview, Schmutz Pond	100
Seligman, Frisco Pool	150
Silex, Norton's pond	200
Strafford, James River	300
Montana:	
Chester, Chester Reservoir	150
Hodges, Anderson's pond	150
Nevada:	
Reno, Washoe Lake	400
New Jersey:	
Frenchtown, Delaware River	250
Marksboro, White Lake	350
Paterson, Hoppers Pond	350
South Plainfield, Mill Pond	350
New Mexico:	
Albuquerque, Kreifel's pond	50
Buchanan, De Graftenreid's lake	50
Elida, Brown's pond	50
Graham's lake	100
Lake Cheyenne	50
Magdalene, Tarque Pond	100
Melrose, Hudgins's pond	50
Montoya, Romero's pond	100
Portales, Byrnes's pond	50
Santa Fe, Jones's pond	100
Socorro, Hall's pond	50
New York:	
Afton, Susquehanna River	850
Millerton, Indian Pond	450

Details of Distribution of Fish and Fish Eggs—Continued.

CATFISH—Continued.

Disposition.	Fingerlings, yearlings, and adults.
New York—Continued.	
Riverdale, Steiner's lake	150
Schenevus, Schenevus Creek	200
Sullivan, York Lake	450
North Carolina:	
Stovall, Gregory's pond	200
North Dakota:	
Berthold, Petry's pond	200
Devils Lake, Devils Lake	1,000
Hebron, Knife River Pond	200
Lakota, Swan Lake	300
New Salem, Clear Lake	200
St. John, Wheaton Lake	200
Ohio:	
Blanchester, Lake Seewald	350
Orangeville, Pymatuning Creek	400
Oklahoma:	
Alva, Wright's pond	50
Manchester, Manchester Park Lake	100
Rife's lake	100
Texahoma, Bennett's pond	50
Oregon:	
Yoncalla, Devils Lake	300
Pennsylvania:	
Alderson, Harveys Lake	450
Arcola, Perkiomen Creek	350
Birdsboro, Hay Creek	200
Indian Creek	150
Bloomsburg, Fishing Creek	150
Catawissa, Susquehanna River	150
Dushore, Headley Pond	150
Elizabethville, Mountain Creek	100
Jamison City, Painter Den Pond	150
Lebanon, Stovers Lake	150
Mast Hope, Lake Westcolang	150
Merion, Penn Ivy Lake	100
Mifflin, Kauffman's pond	100
Oaks, Schuylkill River	350
Oak Ridge, Alcola Park Lake	100
Petersburg, Shavers Creek	250
Pittsburg, Pump Station Lake	150
Pleasant Mount, Buller's pond	150
Rahns, Perkiomen Creek	250
Reading, Tulpehocken Creek	150
Rising Springs, Penns Creek	150
Sinking Creek	450
Rockton, Sugar Camp Run Pond	100
Rowland, Big Tink Lake	150
Burcher's lake	300
Lake Westcolang	300
Little Tink Lake	300
Saxtons Lake	150
Sims Pond	150
Teedyuskung Lake	150
Wolf Lake	150
Sellersville, Ridge Valley Creek	350
Sewickley, Way's pond	250
Shade Gap, Shade Gap Creek	100
Sugar Run, Hoop's pond	150
Temple, Dantersville Ice Pond	150
Tylersburg, Wills's pond	100
Yerkes, Perkiomen Creek	350
South Carolina:	
Abbeville, Little River	100
Barksdale, South Rabun Creek	1,500
Blackville, Spur Branch	100
Campobello, Buffalo Lake	125
Halston Creek	200
Motlow's pond	650
Donalds, Barmore's pond	250
Branch Pond	800
Clear Pond	500
Gibson Pond	1,000
Still House Pond	1,000
South Carolina—Continued.	
Easley, Ellison's lake	125
Edgefield, Holland's pond	100
Honea Path, Canfield's pond	125
Clear Water Pond	100
Gambrell's pond	125
Little River Pond	125
Johnston, Wright's pond	100
Lamar, Windham's pond	100
Liberty, Spring Pond	125
Norris, Bluckerby's lake	250
Hunter's pond	125
Spring Pond	125
Pomaria, Railroad Pond	100
Rockton, Castle's pond	100
Troy, Cook's pond	100
Creswell's pond	100
Rocky Creek	100
White Pond, Ditch Pond	100
Williamston, Saluda River	200
South Dakota:	
Blunt, Brooking's pond	100
Crocker, Swan Lake	150
Fairfax, Jenner's pond	150
Lindgren's pond	200
Loyalton, Barton's pond	100
Philip, Robinson's pond	200
Plankinton, Dougan's lake	200
Presho, Walker's pond	150
Waubay, Dry Wood Lake	300
Tennessee:	
Algood, Falling Water	25
Cookeville, Johnson Branch Pond	250
Greenback, Hudson Pond	150
Hills Station, Branch Pond	125
Jefferson City, Holbert's pond	250
Joppa, Henry's pond	125
Lebanon, Woodland Pond	250
McKenzie, Guin Creek	200
McMinnville, Barren Fork River	200
Tate Springs, German Creek	60
Tazewell, Mountain Lake	125
Texas:	
Austin, Peaceful Valley Lake	30
Virginia:	
Catlett, Cedar Creek	200
Fairfax, Accotink Creek	300
Richmond, Gibbs Pond	200
Washington:	
Addy, Dubois Lake	200
Elma, Chehalis River	350
Nahcotta, Skating Lake	155
Sprague, Fourth of July Lake	200
Vancouver, Vancouver Lake	350
Wenatchee, Chisholm's reservoir	150
West Virginia:	
Inwood, Back Creek	300
Hog Creek	200
Mill Creek	200
Wellsburg, Ohio River	850
Wisconsin:	
Beaver Dam, Beaver Dam Lake	300
Genoa, Mississippi River	8,000
Grand Rapids, Wisconsin River	4,200
Independence, Bugle Lake	300
La Crosse, Mississippi River	50,500
Prairie du Chien, Mississippi River	44,405
Sheboygan Falls, Sheboygan River	400
Wyoming:	
Newcastle, Baird's lake	300
Nelson's lake	250
Total [a]	562,580

[a] Lost in transit, 12,199 fingerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

CARP.

Description.	Fingerlings, yearlings, and adults.	Description.	Fingerlings, yearlings, and adults.
Florida:		Virginia:	
Orlando, Wichtendahl's pond	20	Barboursville, Cleveland run	25
Illinois:		Low Moor, Pike Pond	25
Meredosia, Illinois River	7,691		
Maryland:		Total[a]	7,807
Stemmers Run, Reich's pond	25		
Tennessee:			
Netherland, Matthew's run	21		

BUFFALOFISH.

Illinois:		Wisconsin:	
Meredosia, Illinois River	200	Genoa, Mississippi River	2,000
Iowa:		La Crosse, Mississippi River	12,000
North McGregor, Mississippi River	16,700	Prairie du Chien, Mississippi River	13,500
Minnesota:			
Brownsville, Mississippi River	13,000	Total	57,000

SHAD.

Disposition.	Eggs.	Fry.	Disposition.	Eggs.	Fry.
Maryland:			North Carolina—Cont'd.		
Accokeek Creek, mouth, Potomac River		885,000	Merry Hill, Albemarle Sound		5,731,000
Battery Flats, Chesapeake Bay		940,000	Oregon:		
Broad Creek, mouth, Potomac River		1,168,000	Oregon City, Willamette River		969,000
Havre de Grace, Chesapeake Bay		2,717,000	Virginia:		
Havre de Grace, Susquehanna River		482,000	Chain Bridge, Potomac River		168,000
Pamunkey Creek, mouth Potomac River		1,858,000	Dogue Creek, mouth, Potomac River		2,345,000
Piscataway Creek, mouth, Potomac River		884,000	Little Hunting Creek, Potomac River		2,135,000
Principio, Chesapeake Bay		704,000	Occoquan Bay, Potomac River		1,135,000
Swan Creek, Potomac River		323,000	Pohick Creek, Potomac River		1,925,000
North Carolina:			Washington:		
Avoca, Albemarle Sound		11,803,000	Oregon City, Willamette River		620,000
Albemarle Sound	266,000		Snohomish, Snohomish River		120,000
Edenton, Albemarle Sound		20,820,000	Total	266,000	57,112,000

WHITEFISH.

Illinois:			Michigan—Continued.		
Havana, Illinois Fish Commission	7,000,000		Fishermans Home, Lake Superior		2,400,000
Michigan:			Fishermans Reef, Lake Michigan		3,000,000
Beaver Island, Sand Bay		5,000,000	Iroquois Point, Lake Superior		3,000,000
Belle Isle, Detroit River		33,000,000	Manistique, Lake Michigan		1,000,000
Beulah, Crystal Lake		500,000	Marquette, Lake Superior		4,200,000
Big Flat Reef, Lake Michigan		4,000,000	Middle Island, Lake Huron		1,250,000
Charlevoix Reef, Lake Michigan		7,500 000	North Point, Lake Huron		5,000,000
Detour, Lake Huron		5,000,000			
Detroit, Detroit River		1,000,000			
Escanaba, Lake Michigan		1,000,000			

[a] There were lost in transit 30 finerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

WHITEFISH—Continued.

Disposition.	Eggs.	Fry.
Michigan—Continued.		
Ontonagon, Lake Superior		4,200,000
Oscoda, Lake Huron		3,750,000
Sault Ste. Marie, Hay Lake		3,000,000
Scarecrow Island, Lake Huron		10,000,000
St. Ignace, Straits of Mackinac		1,000,000
Whitefish Point, Lake Superior		6,000,000
Windmill Point, Lake St. Clair		4,000,000
Minnesota:		
Duluth, Lake Superior		200,000
Susie Island, Lake Superior		4,800,000
Montana:		
Anaconda, Flathead Lake	500,000	
New York:		
Cooperstown, Otsego Lake		775,000
Grenadier Island, Lake Ontario		9,370,000
Mexico Bay, Lake Ontario		5,000,000
New York—Continued.		
New York City, New York Aquarium	600,000	
Tibbetts, Lake Ontario		1,000,000
Wilson Bay, Lake Ontario		4,500,000
Ohio:		
Catawba Island, Lake Erie		10,000,000
Isle St. George, Lake Erie		10,000,000
Kelleys Island, Lake Erie		20,000,000
Middle Bass Island, Lake Erie		10,000,000
Port Clinton, Lake Erie		10,000,000
Put-in Bay, Ohio Fish Commission	55,548,000	
Put-in Bay, Lake Erie		69,000,000
Toledo, Lake Erie		10,000,000
Pennsylvania:		
Erie, Pennsylvania Fish Commission	58,572,000	
Wisconsin:		
Aminicon River, Lake Superior		4,000,000
Oshkosh, Michigan Fish Commission	20,000,000	
Total	142,220,000	277,445,000

CHINOOK SALMON.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
California:			
Baird, McCloud River		3,590,078	
Eel River, California Fish Commission	5,440,000		
Sisson, California Fish Commission	26,599,265		
Massachusetts:			
Boston, Sportsmens Show			100
Michigan:			
Detroit, Detroit Aquarium	14,000		
New Hampshire:			
Bristol, Newfound Lake			620
Newbury, Lake Sunapee			14,270
Sunapee, Lake Sunapee			23,800
Weirs, Lake Winnepesaukee			18,690
New York:			
Cooperstown, Otsego Lake			1,000
Tuxedo, Tuxedo Club	25,000		
Oregon:			
Cazadero, Clackamas River		1,239,750	
Clackamas, Clackamas River		2,050,195	2,763
Station Creek		960,000	
Minam, Oregon Fish Commission	3,050,000		
Rogue River, Berry Creek		40,000	
Elk Creek		245,000	
Rogue River		486,710	
Salmon River, Oregon Fish Commission	3,531,000		
Washington:			
Baker, Baker Lake		193,780	
Big White Salmon Station, Columbia River		5,244,015	
Birdsview, Day Creek		9,094	
Grandy Creek		126,664	
Phinney Creek		65,000	
Little White Salmon Station, Columbia River		1,800,000	9,586
Little White Salmon River		4,127,000	4,600
Argentina:			
Argentine Government, Buenos Aires	200,000		
Total [a]	38,859,265	20,177,286	75,429

[a] Lost in transit, 1,375 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SILVER SALMON.

Disposition.	Eggs.	Fry.
Alaska:		
Yes Bay, Yes Lake		9,900
California:		
Brookdale, Santa Cruz County Hatchery	50,000	
New Hampshire:		
Laconia, New Hampshire Fish Commission	50,000	
New York:		
New York, New York Aquarium	5,000	
Oregon:		
Cazadero Clackamas River		1,156,915
Medford, Bear Creek		4,500
Rogue River—		
Elk Creek, West Branch		104,000
Rogue River		347,000
Trail Creek		40,000
Trail, Rogue River		131,000
Oregon—Continued.		
Wilderness, Applegate River		10,500
Wilderville, Applegate River		6,000
Pennsylvania:		
Pleasant Mount, Pennsylvania Fish Commission	75,000	
Washington:		
Baker, Baker Lake		5,867,460
Birdsview, Day Creek		73,695
Grandy Creek		1,289,955
Grandy Lake		250,000
Phinney Creek		180,000
Argentina:		
Argentine Government, Buenos Aires	92,000	
Total	272,000	9,470,925

BLUEBACK SALMON.

Alaska:		
Afognak, Ahuyon Creek		39,325,870
Yes Bay, Lake McDonald		18,353,000
Yes River		30,300,000
Washington:		
Baker, Baker Lake		5,384,726
Birdsview, Grandy Lake		45,900
Argentina:		
Argentine Government, Buenos Aires	100,000	
Total	100,000	93,409,496

HUMPBACK SALMON.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Alaska:		
Afognak, Ahuyon Creek	10,000	100

STEELHEAD TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
California:			
Brookdale, Santa Cruz County Hatchery	1,468		
Michigan:			
Baldwin, Pere Marquette River, branch		5,000	
Branch, Pere Marquette River, branch		5,000	
Munising, Au Train River	50,000		
Twin Lakes, Big Blue Lake		6,000	
Watersmeet, Loon Lake			15,000
Wingleton, Pere Marquette River, branch		5,000	
Minnesota:			
Duluth, Lester River			15,500
Nevada:			
Carson City, Nevada Fish Commission	50,000		
Oregon:			
Cazadero, Clackamas River		315,000	
Clackamas, Clackamas River		119,831	
Eagle Creek, Eagle Creek		60,630	
Trail, Rogue River		868,347	
Wilderville, Applegate River		10,500	
Utah:			
Murray, Miller Pond	10,000		

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

STEELHEAD TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Vermont:			
Barton, Crystal Lake		25,994	
Chester, Lowell Lake		10,420	
Derby Line, Tomaphobia River		5,000	
Lyndonville, Bean Pond		10,000	
Newport, Salem Pond		12,000	
Swanton, Dian Brook		5,000	
Washington:			
Birdsview, Day Creek		132,553	
Grandy Creek		475,138	
Skagit River		110,000	
Seattle, Oregon Fish Commission for Alaska-Yukon Exhibit	50,000		
Sultan, Wild Pond	25,000		
Walla Walla, Bryan Creek	25,000		
Wenatchee, Lake Alta			1,000
Wisconsin:			
Lampson, Pelemy Lake			15,000
Wyoming:			
Sheridan, Wyoming Fish Commission	60,000		
Total	271,468	2,181,413	46,500

RAINBOW TROUT.

Alabama:			
Fort Payne, Crystal Lake			4,000
Arizona:			
Flagstaff, Live Oak Creek			6,000
Rock Creek			3,000
Grand Canyon, Indian Gardens Creek			3,000
Holbrook, Pine Lake			3,000
Safford, Ash Creek			3,000
Arkansas:			
Alpena, Long Creek			5,000
Gentry, Springdale Lake			5,000
Harrison, Crooked Creek			12,500
Monte Ne, Monte Ne Lake			2,000
Myrtle, Bear Creek			5,000
Springdale, Big Spring			1,020
Sulphur Springs, Butler Creek			5,000
Thompson, Mountain Lake			5,000
Colorado:			
Bailey, Platte River			8,000
Basalt, Dinkle Lake		12,000	
Buffalo, Buffalo Creek			3,000
Lake Cheesman			19,500
Platte River			8,000
Cimarron, Mack Lake		10,000	
Van Boxel's lakes		18,000	
Cliff, Deer Creek			4,000
Crescent, Carter Lake		10,000	
Echo Lake		5,000	
De Beque, Plateau Creek			3,000
Delta, Surface Creek		15,000	
Grand Lake, Fish Creek		8,200	
Grand Lake		15,000	
Grand River		15,000	
Grand River, North Fork		8,000	
Grand River, South Fork		23,000	
Grand Mesa Lakes, Ward Lake		65,000	
Green Mountain Falls, Spring Pond		2,000	
Morrison, Summit Lake			3,000
New Castle, East Divide Creek			6,000
East Elk Creek			6,000
Ophir, Spring Lake			3,000
Park Siding, South Platte River, North Fork			5,600
Rico, Meadow Brook			18,000
Scotch Creek			4,500
Salida, Lake Isherwood		3,000	
Miklich's ponds		4,000	1,000
Shawnee, Prices Creek			3,000
South Platte, South Platte River, North Fork			16,000
South Platte River, South Fork			8,000
Thomasville, Frying Pan River			8,000
Twin Lakes, Twin Lakes			20,000
Weston, Storz Lake			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Georgia:			
Chickamauga, Crawfish Spring			8,000
Clayton, Scotts Creek			2,400
Stekoa Creek			6,000
Timpson Creek			2,400
Warwoman Creek			2,400
Eves Station, Young's pond			1,100
Lawrenceville, New Hope Springs			600
Talking Rock, Anderson's pond			1,400
Tate, Wise Creek			2,200
Toccoa, Haddock Inn Lake			1,200
Idaho:			
Bellevue, Oswego-Broadford Slough			250
South Broadford Slough			250
Guffey, Soda Spring Pond			200
Hailey, Big Wood River			800
Cold Springs Lake			200
Ketchum, Eagle Creek			400
Lake Creek			400
Trail Creek			600
Warm Springs Creek			600
Wood River			800
Wood River, North Fork			400
Lorenzo, Hie Pool Slough			500
Malad City, Spring Pond			100
Stuart's springs			200
Market Lake, Hie Pool Slough			300
Novene, Big Spring Creek			200
Priest River, Granite Creek			700
Hunt Creek			400
Kalispell Creek			500
Lamb Creek			500
Shoshone, Little Wood River			800
Spirit Lake, Spirit Lake			800
Tessmini Creek			400
St. Anthony, Clear Creek Pond			200
Little Spring Creek			200
Sugar City, Lue Springs Pond			200
Weiser, Weiser River			800
Illinois:			
Havana, Illinois Fish Commission	50,000		
Iowa:			
Boone, Willow Lake			1,000
Calmar, Otter Creek			3,000
Chester, Beaver Creek, South Fork			2,500
Cresco, Barker Brook			2,000
Coldspring Brook			2,000
Decorah, Front Run			1,500
Trout Creek			1,200
Hopkinton, Plum Creek			12,000
Jesup, Spring Creek			2,000
Manchester, Coffin Creek			3,000
Honey Creek			3,500
Maquoketa River			4,400
Spring Branch			3,000
McGregor, Sni Magill Creek, branch			1,600
Postville, Yellow River			2,000
Maine:			
Northeast Harbor, Upper Hadlock Pond		7,400	
Maryland:			
Annapolis Junction, Dorsey Branch		8,800	
Baltimore, Maryland Fish Commission	50,000		
Bel Air, Cool Branch			1,500
Glencoe, Isinglass Pond			600
Glyndon, Lake Jorosa			1,500
Hagerstown, Long Meadow Stream			2,000
Hoods Mill, Piney Run Pond		9,000	
Mount Savage, Trimble's pond			800
Oakland, Muddy Creek			2,000
Snyder's pond			800
Rocky Ridge, Turkey River			1,500
Rogers, Mayfair Brook			200
Salisbury, Parsons Pond			4,500
Thurmont, Hunting Creek			3,000
Massachusetts:			
Barre, Gaston's pond			500
Wilkinsonville, Massachusetts Fish Commission	50,000		

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan:			
Crystal Falls, Paint River			9,000
Minnesota:			
Fillmore County, Ætna Creek			3,000
Slough Creek			3,000
Plainview, Long Creek			2,900
Whitewater River, North Branch			2,900
Stockton, Rollingstone Creek, South Branch			12,000
Missouri:			
Aurora, Crane Creek			10,000
Little Crane Creek			2,000
Little Flat Creek			12,500
Spring River			2,400
Williams Creek			5,000
Bourbon, Blue Spring			5,000
Brown Springs, Brown Springs			5,000
Clever, Bailey's lake			5,000
Silver Lake			12,500
Terrell Creek			5,000
Crane, Crane Creek			1,000
McCard Branch			1,000
Cuba, Elm Spring Pond	20,000		
Melva, Turkey Creek			10,000
Monett, Little Flat Creek			1,000
Little Flat Creek Pond			3,000
Mount Vernon, Clever Creek			2,000
Neosho, Cold Spring Pond			600
Hearsells Branch			60
Hickory Creek			3,720
Rawling's pond			2,100
Silver Lake			1,000
Spring Branch			36
Newburg, Little Piney Creek			2,400
Little Piney River			1,000
Mill Creek			4,800
Republic, Silver Lake			2,000
Rolla, Little Piney Creek			5,000
Mill Creek			1,000
Schlichts, Schlichts Spring			4,800
Sparta, White River, Finley Branch			1,000
Springfield, James River			3,000
Lake Reflection			10,000
Ritlers Mill Lake			2,000
Spring Creek Lake			2,000
St. James, Meramec River			5,000
Summerfield, Pay Down Creek			5,000
Thayer, Eleven Points River			20,000
Piney Pond			10,624
Wheaton, Joy Creek			1,500
Pogues Creek			1,020
Shoal Creek			1,020
Montana:			
Anaconda, Echo Lake			700
Ballantine, Big Spring			200
Bridger, Clarks Fork River			800
Browns Station, Big Hole River			700
Kalispell, Lake Ronaw			800
Lewistown, Big Casino Creek			2,000
Flatwillow Creek, North Fork			2,000
Thompson, Squaw Creek			700
Nevada:			
Ely, Henry Creek			5,000
New Hampshire:			
Concord, Suncook River		4,169	
Keene, Ashuelot River		4,170	500
Potter Place, Ragged Mountain Pond		4,169	
Warren, Bakers River			1,000
Wilton, Hodgkins Brook			500
New Mexico:			
Alamogordo, Macy's pond			600
Portico Rico Pond			600
Chama, Chama River			5,600
Glorieta, Bull Creek			3,000
Pecos River			3,000
Raton, Chicarico River, West Fork			6,000
New York:			
Caledonia, New York Fish Commission	10,000		
Cold Spring Harbor, New York Fish Commission	10,000		

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New York—Continued.			
Hunter, Windham Creek		1,500	
Mount Pleasant, Esopus Creek		3,000	
New York, New York Aquarium	5,000		
Orange Mountain Pond			500
Raquette Lake, Lake Kora	50,000		
North Carolina:			
Almond, Tabors Creek			3,000
Andrews, Junaluska Creek			2,000
Town Creek			2,000
Asheville, Big Ivy Creek			2,000
Flat Creek			2,000
Lake Burroughs			800
Reems Creek			2,000
Black Mountain, Swannanoa Creek			3,000
Swannanoa Creek, North Fork			3,000
Boonford, Toe River, South Branch			5,800
Bryson City, Alarka Creek			11,250
Bridge Creek			3,000
Deep Creek			3,750
Deep Creek, North Fork			3,000
Dicks Creek			3,750
Indian Creek			3,000
Indian Creek, North Fork			3,000
Poll Brad Creek			3,000
Bushnell, Forneys Creek			3,000
Cranberry, Cow Camp Creek			4,000
Linville River			4,000
Squirrel Creek			8,000
Dillsboro, Scotts Creek			6,000
Tuckaseegee River			9,500
Goldsboro, Fara Springs Pond			580
Graham, Haw Creek			1,160
Hendersonville, Big Hungary Creek			6,000
Green River			6,000
Little Clear Creek			2,000
Little Hungary Creek			2,000
Reese Mill Creek			4,000
Huntdale, Bald Creek			4,320
Barnett's pond			1,000
Kellerville, Beech Creek			4,000
Madison County, Shelton Laurel River			20,000
Melrose, Pacolet River			2,000
Morganton, Canoe Creek			6,000
Craigs Creek			4,000
Irish Creek			6,000
Little Fork Creek			4,000
North Cove Creek			6,000
Russell Creek			4,000
Steels Creek			6,000
Table Rock Creek			4,000
Upper Creek			10,000
Mortimer, Harper Creek			1,200
Murphy, Bald Spring Branch			1,500
Cabin Branch			1,500
Cherry Mill Creek			3,000
Cold Branch			3,000
Collett Creek			2,250
Compode Creek			3,000
Eagle Fork Creek			3,000
Geeskee Creek			4,500
Hothouse Creek			3,000
Hurricane Creek			3,000
Lick Log Creek			2,250
Little Tooney Creek			2,250
Mattocks Creek			1,500
Mill Creek			1,500
Peckerwood Creek			3,000
Perry Creek			1,500
Pounding Mill Creek			2,250
Ranges Creek			3,000
Sweetwater Creek			2,250
Thumping Creek			1,500
Tooney Creek			3,000
Valley River			4,000
Vineyard Creek			1,500
Wolfe Branch			1,500

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
North Carolina—Continued.			
Nantahala, Otter Creek			3,000
Catawba Creek			3,000
Old Fort, Gilliam's pond			2,500
Jarretts Creek			3,000
Mill Creek			3,750
Otto, Bradley and Norton Creek			2,400
Coweata Creek			5,400
Middle Creek			2,400
Shoal Creek			1,800
Pineola, Linville River			12,000
Pisgah Forest, Davidson River			6,800
Raleigh, Crabtree Creek			6,500
Saluda, Camp Creek			2,000
Cove Creek			2,000
Spruce Pine, Grassy Creek			5,000
Sylva, Caney Fork Creek			10,000
Moses Creek			10,000
Taylorsville, Adams Pond			1,000
Toxaway, Horse Pasture River			11,240
Indian Creek			11,240
Lake Toxaway			11,240
Thompson River			11,240
Whitewater River			11,240
Tryon, Pacolet Creek			10,000
Vaughns Creek			5,000
Vale, Toe River			4,000
Waynesville, Big Pigeon River			5,000
Cathey Cove Creek			2,250
Lick Log Branch			2,250
Pigeon River, East Fork			3,000
Scape Cat Creek			2,250
Shiner Creek			2,250
Sorrells Creek			2,250
Zirconia, Green River			5,000
North Dakota:			
Mercer, Blue Lake			200
Brush Lake			200
Crystal Lake			200
Olsons Lake			200
Ohio:			
Smithville, Kiefer's pond			500
Oregon:			
Glendale, Cow Creek		5,000	
Hood River, Crusoe Creek		4,000	
Medford, Big Butte Creek		3,000	
Big Butte Creek, North Fork		3,000	
Little Butte Creek		4,000	
Rogue River, North Fork		4,000	
Milton, Walla Walla River		5,000	
Myrtle, Umpqua River, South Fork		4,000	
West Fork, Cow Creek, West Fork		5,000	
Pennsylvania:			
Austin, Cowley Run			2,100
Bedford, Bobbs Creek			2,200
Cove Creek			2,500
Belleville, Peachy Run			3,000
Stone Creek			3,000
Benton, Welliver Run			1,500
Chambersburg, Birch Creek			8,000
Carbaugh Run			2,500
Hoosic Run			2,500
Cherry Tree, Rock Run			3,500
Cresco, Bushkill Creek			4,000
Delta, Neils Run			2,500
Franklin, Silver Creek			1,200
Glenlock, Jacobs Mine Hole			600
Hastings, Glass's run			800
McElhattan, Chatham's run			2,000
Mahanoy City, Monongahela Creek			1,400
Middlebury, Crooked Creek			4,000
Millersburg, Little Wiconisco Creek			3,000
Reading, Cacoosing Creek			1,500
Summerhill, Laurel Run			3,000
Roaring Run			3,000
Salt Lick Creek			3,000
Susquehanna, Brushville Creek			2,000

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Susquehanna, Starrucca Creek			3,000
Tunkhannock Creek			5,000
Waterville, Little Pine Creek			4,000
Windber, Big Paint Creek			4,000
Breast Works Run			2,000
Biscuit Spring Run			1,500
Clear Shade Creek			4,000
Dark Shade Creek			6,000
Egolph Run			2,000
Lower Run			2,000
Partridge Run			2,500
Piney Run			3,000
Shade Creek, North Fork			1,500
York, Fishing Creek			2,000
South Carolina:			
Newry, Cane Creek			11,400
Pickens, Big Estatoe Creek			10,000
Pickens County, Estatoe Creek			1,740
Seneca, Boom Creek			2,400
Jenets Fork Creek			3,600
Thompson Creek			1,800
White Water Creek			3,600
Spartanburg, Water Works Reservoir			2,000
West Union, Boons Creek			2,400
South Dakota:			
Cascade Spring, Cascade Creek			8,000
Elmore, Spearfish Creek			10,900
Spearfish Creek, Southwest Branch			900
Hermosa, Lower Battle Creek			8,000
Middle Battle Creek			8,000
Squaw Creek			8,000
Stenger Lake			8,000
Upper Battle Creek			8,000
Hill City, Newton Fork			10,000
South Slate Creek			8,000
Spring Creek			22,000
Sunday Gulch Creek			8,000
Nahant, Rapid Creek, North Fork			8,000
Spearfish, Lindleys Spring Branch			5,000
Spring Creek			800
Water Cress Creek			800
Tennessee:			
Blevins, Doe River			5,250
Roaring Creek			2,250
Bristol, Thomas Creek			6,000
Butler, Lineback Springs			1,000
Farner, Turtle Creek			2,500
Fishery, North Indian Creek			103,000
Spring Branch			200
Vance's pond			2,000
Greenville, Camp Creek			4,000
Hampton, Doe River			6,000
Laurel Creek			8,000
Hartford, Lambs Gulf Creek			9,500
McMinnville, Myers's pond			2,000
Roan Mountain, Doe River			2,500
Hampton Creek			4,000
Heaton Creek			6,500
Little Doe River			2,500
Walasi Creek			2,500
Sadlersville, Elk Fork Creek			9,500
Sutherland, Beaver Dam Creek			10,000
Townsend, Spring Creek			9,600
Tullahoma, Ledford Mill Pond			2,000
Utah:			
Logan, Blacksmith Fork River			3,500
City Park Spring			1,000
Davis's pond			1,000
Valley View Trout Pond			1,000
Murray, Erekson Springs			1,400
Provo River			1,400
Provo, Provo River			17,600
Salt Lake City, MacDuff's reservoir			2,100
Virginia:			
Abingdon, Harolds Creek			1,000
Barbours Creek, Barbours Creek			7,500
Bremo, Phelps Creek			1,000

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Virginia—Continued.			
Christiansburg, Dew Branch Lake			2,500
Clay, Cedar Branch			1,200
Cleveland, Big Cedar Creek			5,600
Big Moccasin Creek			5,600
Brumley Creek			5,600
Carre Creek			5,600
Copper Creek			5,600
Dumps Creek			5,600
Gilmer Creek			5,600
Little Cedar Creek			4,340
Little Moccasin Creek			5,600
Opossum Creek			5,600
Stonebruise Creek			5,600
Clifton Forge, Wilson Creek			12,750
Fairwood, Fox Creek			8,000
Fries, New River			5,000
Peach Bottom Creek			3,000
Front Royal, Rush Creek			1,500
Glade Spring, Holston River Pond			800
Hightown, Jackson River			5,000
Konnarock, Laurel River			8,000
Luray, Deford's pond			700
Lynchburg, Burtons Creek			2,000
Dreaming Creek			1,500
Tomahawk Creek			2,500
Marion, Holston River			5,000
Staley's Creek			10,000
Meadow View, Witten's pond			2,000
Millboro, Mill Creek			3,750
Natural Bridge, Cedar Creek			12,750
New Castle, Sinking Creek			15,000
Rural Retreat, Buchanan's pond			1,000
Saltville, Laurel Fork Creek			2,500
Tumbling Creek			12,500
Scottsville, Bottom Pond			500
Troutdale, Fox Creek			10.000
Vaucluse, Vaucluse Spring			800
Washington:			
Chehalis, Newaukum River, North Fork			500
Chesaw, Walker Lake			200
Colville, Deep Lake			200
Pomeroy, Pataha Creek			900
Republic, Swan Lake			700
Sumner, Mountain Brook			200
Salmon Springs Pond			200
West Virginia:			
Charleston, Everetts Run			4,200
Cloverlick, Clover Creek			3,000
Curtin, Cranberry River			2,450
Davis, Blackwater River			25,200
Elkins, Little Black Fork River			3,800
Jenningston, Laurel Creek			21,300
Keyser, Alder Run Pond			800
New Creek			2,800
May, Greenbrier River			5,000
Mill Creek, Middle Fork River			6,000
Moatsville, Flowing Spring			1,200
Monitor, Beamer's pond			1,200
Pine Grove, Hope Reservoir			1,750
Porterwood, Pleasant Run			4,200
Seebert, Cranberry Creek			5,000
Stamping Creek			2,500
Sewell, Manns Creek			3,400
White Sulphur Springs, Spring Branch			223
Wildell, Laurel Run			5,000
Winterburn, Greenbrier River, East Branch			11,000
Wisconsin:			
Arcadia, Eagle Creek			1,800
French Creek			1,800
Holcomb Coulee Creek			1,800
Louis Valley Creek			1,800
North Creek			1,800
Birchwood, Sucker Creek			2,000
Cashton, Coon Creek			7,500
Chippewa Falls, Duncan Creek			12,000
Colby, Spring Creek			2,250
Durand, Eau Galle River			12,000

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Durand, Eau Galle Mill Pond			3,000
Ginder Spring			3,000
Heits Creek			3,000
Eleva, Adams Creek			4,500
Gordon, Ox Creek			7,500
Grand Rapids, Fourmile Creek			7,500
Hixton, Amo Creek			4,500
Holmes Creek			6,000
Judkins Creek			4,500
Nettleton Creek			3,000
Pine Creek			6,000
Independence, Chimney Rock Creek			3,600
Elk Creek			3,600
Plum Creek			3,600
Traverse Valley Creek			3,600
Zimmers Creek			3,600
La Crosse, Big Creek			3,000
Laona, Peshtigo River			4,500
Medford, Black River			15,000
Merrill, Staubs Bayou			7,500
Muscoda, Hooser Creek			6,000
Sand Branch			6,000
Spring Valley, Eau Galle River			15,000
French Creek			1,500
Stanley, Eau Claire River, North Fork			12,000
Stevens Point, Big Plover Creek			800
Trempealeau County, Tamarack Valley Creek			9,000
Waupaca, Round Lake			3,000
Wyoming:			
Basin, Point Rock Creek			800
Green River, Green River, Hennys Fork			5,000
Yellowstone National Park, Gibbon River			7,000
Greba Lake			8,500
Little Black Tail Creek			3,000
Argentina:			
Argentine Government, Buenos Aires	25,000		
Germany:			
Marxzell, near Karlsruhe, applicant	16,150		
Total[a]	286,150	292,408	2,026,463

ATLANTIC SALMON.

Maine:			
Mattawamkeag, Penobscot River			24,430
Penobscot County, Little Spring Brook		50,000	
Penobscot River		597,790	
Massachusetts:			
Boston, Sportsman's Show			5
Total		647,790	24,435

LANDLOCKED SALMON.

Maine:			
Bakers, Bakers Pond			4,000
Bar Harbor, Upper Hadlock Pond			3,000
Belgrade, Great Lake			3,750
Great Pond			2,000
Bigelow, Round Mountain Lake			1,000
Bingham, Pierce Pond			6,000
Rowe Pond			4,200
Boston Ranch, Clear Water Pond			1,200
Brewer Junction, Brewers Pond			5,000
Canton, Lake Anasagenticook		10,000	
Caribou, Maine Fish Commission	100,000		
Carrabassett, Spring Lake		6,000	1,000
Cherryfield, Big Tunk Pond			6,500
Dedham, Branch Pond		34,500	
Green Lake		9,000	9,000

[a] Lost in transit, 15,925 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LANDLOCKED SALMON—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maine—Continued.			
Dover, Sebec Lake		12,000	
East Orland, Craig Pond			1,000
Ellsworth Falls, Beech Hill Pond		10,000	
Webbs Pond		10,000	
Ellsworth, Beech Hill Pond		10,000	5,300
Webbs Pond			6,500
Farmington, Big Island Pond			5,000
Lufkin Pond		10,000	
Mount Blue Pond		10,000	
Franklin, Donnells Pond		10,000	
Molasses Pond		10,000	13,000
Webbs Pond		8,000	
Freeport, Spar Cove and Creek		10,000	
Freyeburg, Lake Kezar			1,000
Grand Lake Stream, Compass Lake			5,800
Dobsis Lake		73,000	15,600
Grand Lake		369,290	8,170
Greenville, Maine Fish Commission	300,000		
Greenville Junction, Moosehead Lake			6,050
Green Lake, Green Lake			9,000
Holden, Fitz Pond			3,000
Kennebunk, Kennebunk Pond		7,500	5,950
Kineo, Moosehead Lake		9,790	
Kineo Station, Moosehead Lake			4,000
Mosquito, Bakers Pond			6,000
North Ellsworth, Branch Pond			5,000
Old Orchard, Staples Pond		7,500	
Oquossoc, Rangeley Lakes		10,000	11,000
Otis, Green Lake		56,725	
Phillips, Gull Pond			3,000
Phillips Lake, Phillips Lake			6,750
Portage, Portage Lake			13,856
Presque Isle, Presque Isle Creek			1,000
Rangeley, Loon Lake			3,000
Rockland, Alford Lake			3,000
Chicawaukie Lake			3,000
Mirror Lake			3,000
Oyster Pond			3,000
Sebago Lake, Sebago Lake		10,000	
Skowhegan, Lake George		8,000	
South Waterloo, Bunganaut Pond		8,000	
Springvale, Mousam Lake		9,000	
Strong, Sweets Pond			2,000
Thorndike, St. George Lake			5,000
Tunk Pond, Tunk Pond			6,500
Warren, South Lake			3,000
Waterville, East Pond			1,250
Wilton, Wilton Lake		10,000	2,000
Winn, Lake Menahga		10,000	
Upper Dobsis Lake			6,900
Winterville, St. Froid Lake		10,000	
Michigan:			
Munising, Perch Lake	10,000		
Sault Ste. Marie, Michigan Fish Commission	30,000		
New Hampshire:			
Bristol, Newfound Lake		3,608	
Concord, Penacook Lake			400
East Andover, Highland Lake			200
Laconia, New Hampshire Fish Commission	50,000		
Meredith, Winnepesaukee Lake		3,608	
Potter Place, Pleasant Lake			2,000
Warner, Lake Winnepauket			2,000
Weirs, Long Pond		3,608	
West Concord, Penacook Lake			1,000
New York:			
Old Forge, Forest, Fish, and Game Commission	30,000		
Raquette Lake, Lake Kora	25,000		
Vermont:			
Beecher Falls, Connecticut Lake		3,408	
Brattleboro, Marlboro South Pond		5,000	
Essex County, Little Averill Lake		15,000	
Greensboro, Caspian Lake		6,013	
Newport, Derby Pond		2,500	
Salem Pond		2,500	
Washington:			
Seattle, Exposition Aquarium			20

Details of Distribution of Fish and Fish Eggs—Continued.

LAND LOCKED SALMON—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wyoming:			
Laramie, Wyoming Fish Commission	10,000		
Yellowstone National Park, Duck Lake			2,000
Yellowstone Lake			7,000
Argentina:			
Argentine Government, Buenos Aires	15,000		
Total	570,000	793,550	237,896

BLACKSPOTTED TROUT.

Alaska:			
Valdez, Beaver Dam Creek	22,400		
California:			
Brookdale, Santa Cruz County Hatchery	420		
Colorado:			
Alamosa, Rio Grande River		40,000	
Aspen, Maroon Creek		20,000	
Bailey, Deer Creek		7,500	
Basalt, Frying Pan River		30,000	
Kelly's lake		20,000	
Berrys Ranch, Eagle River		80,000	
Breckenridge, Barton Creek		5,000	
Blue River		12,500	
Swan River		5,000	
Buena Vista, Cottonwood Creek		17,000	
Cottonwood Lake		37,500	
Colorado Fish Commission		50,000	
Busk, Lakes Charlotte and Mary		25,000	
Cassell, Platte River		17,500	
Cebolla, Gunnison River		17,500	
Cimarron, Big Blue Creek		12,500	
Cliff, South Platte River		17,500	
Clyde, Middle Beaver Creek		17,500	
De Beque, Clear Creek		12,000	
Delta, Cole Lake		30,000	
Escalante Creek		60,000	
Gunnison River		35,000	
Tongue Creek		35,000	
Uncompahgre River		35,000	
Divide, Rule Pond		12,500	
Estabrook, Roland Creek		7,500	
Fort Collins, Buckhorn Creek		10,000	
Cache la Poudre River		25,000	
Glenisle, South Platte River		15,000	
Granby, Columbine Lake		40,000	
Grand Lake, Eightmile and Indian Creeks		15,000	
Fish Creek		10,000	
Fraser River		10,000	
Grand Lake		75,000	
Grand River		45,000	
Grand River, North Fork		35,000	
Grand River, South Fork		15,000	
Ninemile Creek		5,000	
Stillwater Creek		15,000	
Strawberry Creek		20,000	
Willow Creek		30,000	
Grand Mesa Lake, Alexander Lake		50,000	
Barren Lake		75,000	
Bull Creek		15,000	
Cottonwood Creek		20,000	
Cottonwood Lake		25,000	
Cottonwood Lake No. 4		30,000	
Delta County Streams		100,000	
Half Moon Creek		25,000	
Island Lake		75,000	
Twin Lakes		80,000	
Hartsel, South Platte River		12,500	
Hopkins Spur, Beaver Dam Lake		25,000	
Hotchkiss, Crystal Lake		40,000	
Gunnison River, North Fork		35,000	
Idaho Springs, Edith Lake		27,000	
Fall River		13,500	
Ivanhoe, Ivanhoe Lake		10,000	
Lake County, Sugar Loaf reservoir		107,500	
Lake George, Lake George		12,500	

Details of Distribution of Fish and Fish Eggs—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
La Veta, La Veta Lake		8,335	
Leadville, Lake Creek		25,000	
Sugar Loaf Reservoir		42,500	
Tennessee River		25,000	
Loveland, Four Lakes Reservoir		15,000	
Lyons, Estes Park Improvement Association	155,000		
St. Vrain Creek		25,000	
Minturn, Cross Creek		50,000	
Eagle River		56,000	
Montrose, Big Red Creek		5,000	
Clear Creek		5,000	
Dry Creek, East Fork		7,500	
Dry Creek, West Fork		7,500	
Horsefly Creek		7,500	
Little Red Creek		5,000	
Roubideaux River		10,000	
Spring Creek		7,500	
Nast, Frying Pan River		17,500	
Frying Pan River, South Fork		47,500	
New Castle, Elk Creek		15,000	
Norrie, Chatman Lake		10,000	
Frying Pan River, North Fork		25,000	
Ouray, Lake Lenore		7,500	
Pando, Eagle River		56,000	
Paonia, Coal Creek		25,000	
Hubbard Creek		25,000	
Minnesota Creek		25,000	
Terror Creek		25,000	
Parshall, Corral Creek		8,000	
Williams Creek, South Fork		20,000	
Williams Fork Creek		30,000	
Pine Grove, Elk Park lakes		5,000	
Redstone, Cleveholm Lake		240,000	
Rico, Barlow Creek		5,000	
Dolores River		17,500	
Rosemont, East Beaver River		17,500	
Ruedi, Frying Pan River		65,000	
Saderlind, Gould Creek		17,500	
Sapinero, Curicanti Creek		12,500	
Shawnee, South Platte River		50,000	
Sloss, Deer Creek		10,000	
Tabernash, Ranch Creek		25,000	
Tercio, Whiskey Creek		21,000	
Thomasville, Fellows Lake		10,000	
Frying Pan River		30,000	
Lime Creek		25,000	
West Spring Creek		10,000	
White River, South Fork		10,000	
Woods Lake		40,000	
Twin Lakes, Twin Lakes		35,000	
Vasquez, Frazer River		10,000	
Ward, Beaver Creek		10,000	
District of Columbia:			
Washington, Central Station Aquarium			70
Idaho:			
Bellevue, Ashton Creek			2,000
Broadford Slough			2,000
Mabee Slough			2,000
White Creek			2,000
Blackfoot, Blackfoot River			8,000
Bonners Ferry, Myrtle Creek			3,000
Camas, Camas Creek			8,000
Malad City, Spring Pond			1,500
Market Lake, Poole Slough			2,000
Montpelier, Georgetown Creek			2,000
Spring Creek Ponds			6,000
Montana:			
Armstead, Mowry Creek			2,000
Scotts Lake			4,000
Belgrade, Ross Creek			10,000
Spring Lake			10,000
Big Timber, Sweet Grass Creek			34,000
Billings, Three Wolf Creek			4,000
Boulder, Buffalo Creek			2,000
Little Boulder Creek			8,000
McDermott Creek			2,000
Muskrat Creek			4,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Montana—Continued.			
Bozeman, Big Springs Creek			20,000
Bostwick Creek			5,000
Bozeman City Reservoir			25,000
Cottonwood Creek			6,000
Lansing Creek			6,000
Middle Creek			10,000
Story Creek			6,000
Butte, applicant	40,000		
Carbon County, Spring Reservoir			4,000
Chester, Scotch Coulee Creek			4,000
Chimney Rock, Russell's pond			5,000
Collins, Deep Creek			6,000
Spring Creek			2,000
Teton River			2,000
Conrad, Dupuyer Creek			8,000
Craig, Blubber Creek			4,000
Dearborn River			8,000
Elk Creek			5,000
Falls Creek			4,000
Smith Creek			4,000
Spring Lake			3,000
Stickney Creek			8,000
Wolf Creek			6,000
Dell, Sage Creek			6,000
Dillon, Murrays Spring Pond			1,500
Eureka, Lake Glen			5,000
Lake June			5,000
Sophia Lake			5,000
Tetrault Lake			5,000
Fromberg, Bluewater Creek			4,000
Gallatin, Bear Creek			20,000
Bozeman Creek			15,500
Bridger Creek			10,000
East Gallatin River			20,000
Lyman Creek			20,000
Sourdough Creek			20,000
Stone Creek			10,000
Josephine, Sixteenmile Creek			8,000
Kalispell, East Spring Creek			7,000
Horntvedt Lake			9,000
Lewistown, Armells Creek, West Fork			3,000
Beaver Creek			7,000
Big Spring Creek			6,000
Box Elder Pond			3,500
Casino Creek			4,000
Cottonwood Creek			5,000
Little Casino Creek			2,000
McCartney Creek			2,000
Powell's spring			1,500
Spring Creek, East Fork			4,000
Spring Pond			3,500
Surprenant's lake			1,500
Warm Spring Creek			3,500
Lima, Wadam's springs			4,000
Neihart, Belt Creek			8,000
Springdale, Duck Creek			9,000
Kelley Creek			15,000
Rock Creek Lake			10,000
Townsend, Deep Creek			6,000
Troy, Mystery Lake			3,500
Winston, Gravelle Spring			2,000
Nebraska:			
Gordon, Larabee Creek			600
White Clay Creek			600
Wolf Creek			600
New Mexico:			
Aztec, Las Animas River		24,000	
Barranca, El Rito River		13,334	
Espanola, Santa Clara Creek		8,335	
Santa Fe, Waterworks Reservoir		58,334	
New York:			
New York, Battery Park Aquarium	50,000		
Saranac Inn, New York Forest, Fish, and Game Commission.	25,000		
Oregon:			
Ontario, Oregon Fish Commission	100,000		
Oregon City, Pine Creek		10,000	
Trout Creek		10,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Oregon—Continued			
Trail, Elk Creek		13,705	
Rogue River		8,000	
South Dakota:			
Aberdeen, Milwaukee Lake			20,000
Buffalo Gap, Beaver Creek			24,000
Beaver Creek Pond			8,000
Custer, Flynn Creek			20,000
French Creek			67,700
Squaw Creek			22,000
Deadwood, Spring Creek			600
Elmore, Iron Creek			15,700
Little Spearfish Creek			15,700
Spearfish Creek			186,425
Gregory, Ponca Creek			10,000
Hill City, Castle Creek			1,000
Grizzly Creek			7,200
Grou Creek			7,200
Newton Creek			2,400
Palmer Creek			16,800
Slate Creek			1,000
Spring Creek			30,000
Hot Springs, Cold Brook Pond			15,000
Iron Creek, Beaver Creek			1,000
Lawrence County, Bobs Pond			16,000
Mystic, Rapid Creek			32,400
Nahant, Rapid Creek, North Fork			25,000
Nemo, Box Elder Creek			18,600
Box Elder Creek, South Fork			18,000
Jim Creek			18,000
Pennington County, Cold Springs Creek			22,000
Pringle, Beaver Creek			800
Beaver ponds			10,000
Potato Creek			25,000
Rapid City, Crystal Springs lakes			30,000
Intake Pond			9,600
Prairie Creek			672
Rap d Creek			35,344
Spring Creek			672
Squaw Creek			672
Rochford, Castle Creek			1,000
Rapid Creek			12,600
Rosebud, Beads Creek			30,000
Roubaix, Bear Butte Creek			18,000
Corral Creek			18,000
Savoy, Spearfish Creek			40,000
Shannon County, Wounded Knee Creek			600
Silver City, Rapid Creek			1,200
Spearfish, Chicken Creek			10,000
Cox Lake			10,000
Crow Creek			46,000
Franklin Creek			25,000
Miller Creek			8,000
Moss Creek			800
Spearfish Creek			249,000
Spring Creek			34,800
Summers Creek			15,000
Watercress Creek			33,600
St. Onge, False Bottom Creek			1,200
Sturgis, Bear Butte Creek			9,840
Lake Hereford			5,000
Spring Creek			9,000
Warren Creek			27,000
Tilford, Big Elk Creek			9,600
Little Elk Creek			600
Wall Canyon Pond			10,800
Utah:			
Ephraim, New Canyon Lake		10,000	
Fairview, Soldier Creek		10,000	
Murray, Greenriver Pond		5,000	
Miller pond		5,000	
Ogden, Wolf Creek		2,500	
Provo, Provo River		20,000	
Thistle Junction, Mountain Brook		18,000	
Washington:			
Auburn, Green River		10,000	
Mill Creek		10,000	
Charleston, Mission Lake		10,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Washington—Continued.			
Charleston, Tahuyeh Lake		9,900	
Union River		10,000	
Colville, Mill Creek			6,000
Enumclaw, Beaver Creek		10,000	
Pomeroy, Alpowa Creek		9,000	
Deadmans Creek		9,000	
Seattle, Exposition Aquarium			50
Stevenson, Rock Creek		8,000	
Tacoma, Chambers Creek		10,000	
Morgan Lake		10,000	
Muck Creek		10,000	
Salmon Creek		10,000	
Tanwax Creek		10,000	
Voight Creek		10,000	
Vancouver, Battleground Lake		10,000	
Wyoming:			
Aladdin, Clear Springs			8,000
Beulah, Montana Lake			10,000
Sand Creek			19,250
Crook County, Sand Creek			10,000
Spotted Tail Creek			600
Kemmerer, Hams Fork River			8,000
Newcastle, Beaver Creek			40,000
Ranchester, Wyoming Fish Commission	100,000		
Rock River, Rock River		25,000	
Sheridan, Big Horn River			16,000
Custis Lake			12,000
Mill Pond			12,000
Wolf, Wyoming Fish Commission	110,000		
Yellowstone National Park, Cub Creek		1,600,000	
Fisheries Creek		890,000	
Total[a]	602,820	5,993,943	2,049,395

LOCH LEVEN TROUT.

South Dakota:			
Savoy, Little Spearfish Creek			70,000

LAKE TROUT.

Colorado:			
Buena Vista, Cottonwood Lake			16,000
Granite, Twin Lakes			32,000
Connecticut:			
Windsor Locks, Commission of Fisheries and Game	300,000		
Indiana:			
Angola, Lake James		7,500	
Maine:			
Dedham, Green Lake		300,000	
Ellsworth, Pattens Pond		20,000	
Farmington, Varnums Pond		15,000	
Green Lake, Green Lake		15,000	
Madison, Lake George		13,000	
North Belgrade, Lake Messalonkee		1,500	
Phillips, Phillips Lake		15,000	
Unity, Unity Pond		40,000	
Wilton, Pease Pond		15,000	
York County, Great East Lake		50,000	
Michigan:			
Charlevoix Reef, Lake Michigan		1,188,000	
Detour, Lake Huron		1,780,000	
Detroit, Detroit Aquarium	10,000		
Michigan Fish Commission	1,500,000	350,000	15,000
Eagle Harbor, Lake Superior		320,000	
Escanaba, Lake Michigan		500,000	
Fish Island, Lake Superior		800,000	
Fishermans Island, Lake Michigan		1,188,000	
Isle Royal, Lake Superior		800,000	
McCargoes Cove, Lake Superior			240,000
Manistique, Lake Michigan		250,000	
Marquette, Lake Superior		720,000	

[a] Lost in transit, 62,262 fry.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LAKE TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.			
North Point, Lake Huron		3,365,000	
Norwood Reef, Lake Michigan		1,332,000	
Ontonagon, Lake Superior		1,040,000	
Otsego Lake, Otsego Lake			6,000
Point Iroquois, Lake Superior		890,000	
Rock Reef, Lake Michigan		632,000	
Sault Ste. Marie, Michigan Fish Commission	2,000,000		
St. Marys River		890,000	
Scarecrow Island, Lake Huron		1,135,000	
Tobins Harbor, Lake Superior		320,000	
Vanderbilt, Pickerel Lake			9,000
Washington Harbor, Lake Superior		320,000	
Watersmeet, Deer Island Lake			15,000
Whitefish Point, Lake Superior		1,690,000	
Minnesota:			
Beaver Bay, Lake Superior		480,000	240,000
Duluth, Lake Superior			230,000
Ely, Burnside Lake			20,000
French River, Lake Superior		560,000	
Grand Marais, Lake Superior		320,000	
Grand Portage, Lake Superior		320,000	
Grey Eagle, Birch Lake			20,000
Park Rapids, Skunk Lake			20,000
St. Joseph, Big Watab Lake			12,000
Susie Island, Lake Superior		320,000	
Two Harbors, Lake Superior		480,000	240,000
New Hampshire:			
Laconia, New Hampshire Fish Commission	300,000		
Pike, Tarleton Pond		20,000	
Weirs, Lake Winnepesaukee		50,000	
New York:			
Auburn, Owasco Lake		30,000	
Caledonia, Forest, Fish, and Game Commission	3,000,000		
Charity Shoals, Lake Ontario		400,000	
Dutch Point, Lake Ontario		200,000	
Fox Island, Lake Ontario		1,100,000	
Fuller Bay, Lake Ontario		50,000	
Grenadier Island, Lake Ontario		1,000,000	
Kelleys Island, Lake Erie		343,000	
Long Lake West, Catlin Lake		30,000	
New York, New York Aquarium	10,000		
Oswegatchie, Star Lake		30,000	
Point Peninsula, Lake Ontario		300,000	
Raquette Lake, Lake Kora	100,000		
Pennsylvania:			
Susquehanna, East Lake		25,000	
Stearns Lake		25,000	
Union City, Pennsylvania Fish Commission	3,000,000		
Vermont:			
Barton, Baker Pond		5,000	
Crystal Lake		10,000	
Silver Lake		15,000	
Brandon, Lake Dunmore		20,000	
Essex County, Great Averill Lake		26,136	
Little Averill Lake		30,000	
Greensboro, Caspian Lake		10,000	
Island Pond, Echo Pond		5,000	
Orleans, Willoughby Lake		10,000	
Stowe, Vermont Fish Commission	400,000		
West Burke, Center Pond		12,041	
Washington:			
Seattle, Exposition Aquarium			100
Wisconsin:			
Amery, Clare Lake			15,000
Iron River, Lake Superior		480,000	
Oshkosh, Wisconsin Fish Commission	12,126,000		
Sand Island, Lake Superior		480,000	
State Line, Black Oak Lake			15,000
Argentina:			
Argentine Government, Buenos Aires	50,000		
Canada:			
Rossport, Ontario, Lake Superior			200,000
France:			
French Government, Bellefontaine	10,000		
Total[a]	22,806,000	27,188,177	1,345,100

[a] Lost in transit, 15,500 fry.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Arizona:			
Grand Canyon, Bright Angel Creek			2,000
Safford, Frye Canyon			1,000
Colorado:			
Archuleta County, Navajo River			10,500
Aspen, Brush Creek			3,000
Taylor Lake			3,000
Antero, South Platte River			5,000
Bailey, Platte River		24,000	
South Platte River		16,000	
Basalt, Frying Pan River		45,000	
Berrys Station, Eagle River			1,500
Boulder, Simmon's pond		4,000	
Breckenridge, Middle Barton Creek		8,000	
Buena Vista, Cottonwood Lake			7,000
Hartenstein's lake			2,100
Buffalo, Cheesman Lake		52,000	
Wellington Lake		200,000	
Cascade Canyon, Cascade Brook		8,000	
Cassells, Platte River		24,000	
Cebolla, Elk Creek, West Fork		20,000	
Red Creek		12,000	
Chase, Chase Lake		4,000	
Weller's lakes		8,000	
Cimarron, Big Blue Creek		20,000	
Big Cimarron River		20,000	
Cimarron Creek		20,000	
Silver Tip Lake		15,000	
Van Boxel's lake		8,000	
Cliff, Deer Creek		12,000	
South Platte River		16,000	
Clyde, Clyde Lake			2,075
Colorado Springs, City Reservoirs		40,000	
Jimmy Camp Creek		4,000	
Sunnyside Lake		4,000	
Cripple Creek, Pisgah Lake			2,000
Reservoir No. 3			2,100
DeBeque, Bull Creek			2,000
Plateau Creek			3,500
Del Norte, Rio Grande			4,000
Delta, Escalante Creek		24,000	
Roubideaux Creek		24,000	
Denver, Estes Park Hatchery			5
Dillon, Rock Creek		8,000	
Slate Creek		8,000	
Tenmile Creek		12,000	
Willow Creek		8,000	
Divide, Rule Creek Pond			1,500
Dome Rock, South Platte River		16,000	
Eastonville, Russell Lake		4,000	
Wilson Creek		8,000	
Elbert, West Kiowa Lake			500
Eldora, Lake Eldora			6,000
Estes Park, Big Thompson River	100,000		
Fort Collins, Cache la Poudre River			2,500
Cache la Poudre River, North Fork		24,000	
Dale Creek		20,000	
Dixon Canyon Reservoir		20,000	
Fish Creek		20,000	
Glenwood Springs, Crawford's pond		4,000	
Grand Mesa Lakes, Eggleston Lake		90,000	
Hartsel, Antero Reservoir			12,750
Idaho Springs, Fall River			3,500
Lake Edith		80,000	
Sherwins Lake			2,500
Silver Creek			2,000
Ivanhoe, Frying Pan River			15,000
La Junta, Wyman Lake			1,400
Lake George, Lake George			3,500
Leadville, Colorado Gulch Pond			3,000
Crystal Lake		35,000	
Derry's lake			15,000
Musgrove's lake		240,000	1,000
Twin Lakes		35,000	
Twin Lakes Creek		40,000	
Zoebel's lake			20,000
Loveland, Four Lakes Reservoir			2,500
Lyons, St. Vrain River			5,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
Lyons, St. Vrain River, North Fork			2,500
St. Vrain River, South Fork			2,500
Minturn, Echo Lake			6,000
Morrison, Lake Lincoln			5,000
Lake Summit			5,000
Nast, Frying Pan River, South Fork		20,000	
Ouray, Lake Lenore			2,800
Palmer Lake, Monument Creek		24,000	
Pine Grove, Wright's pond		4,000	
Rico, Meadow Creek			4,200
Silver Creek			3,500
Rifle, Rifle Creek			2,400
Ruedi, Ruedi Lake		8,000	
Salida, Arkansas River, South Fork			7,200
Miklich's pond		52,000	
Ridgeway's pond		40,000	
South Arkansas River, North Fork			3,600
Sapinero, Crystal Creek			700
South Fork, Rio Grande			4,000
Thomasville, Frying Pan River			12,000
White River, South Fork			7,100
Woods Lake		120,000	
Tercio, Monument Lake			4,500
South Strawberry Lake			2,500
Wilkins Creek			4,000
Wagon Wheel Gap, Rio Grande			3,000
Wolcott, Eagle River			5,000
Connecticut:			
Bolton, Box Brook			540
Cedar Hill, Farm Brook			800
Danbury, Fox Pond Brook		5,000	
Pappoose Lake		20,000	
Still River, branch		5,000	
Derby, Brown's lake		3,000	
East Hampton, Strongs Pond			270
Goodspeeds, Cane Brook		3,500	
North Brook		8,000	
Pine Brook		5,000	
Roaring Brook		8,000	
Tanyard Brook		5,000	
Hartford, Westbrook		3,500	
New Canaan, Dantown Creek			540
Fivemile Creek			540
Frog Town Brook			540
Norwalk River			540
Poorhouse Creek		3,500	
Noroton, Shipway's pond		3,000	
Norwalk, Barrett Brook			240
Comstock Brook			240
New Canaan Creek			240
Norwalk River, West Branch			240
Silvermine Creek			240
Stoney Brook			240
Talmadge Creek			240
Weston Brook			240
West Norwalk Creek			640
Wilton Creek			240
Roxbury Falls, Grace Brook			405
Tcheanders Brook			405
Simsbury, Eno's pond			540
South Norwalk, Aspetuck River			405
Darwin Creek			647
Valley Forge Creek			400
Tariffville, Spring Pond			540
Waterbury, Eightmile Brook			204
Hop Brook			216
Lilley Brook			205
Mad River			204
Tracy's lake			204
Windsor Locks, Connecticut Commission of Fisheries and Game	30,000		
Delaware:			
Wilmington, Sedgely Pond			500
District of Columbia:			
Washington, Central Station Aquarium			50

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Georgia:			
Blue Ridge, Fighting Town Creek			3,000
Mountain City, Blacks Creek			1,800
Idaho:			
American Falls, Bonanza Lake			1,200
Blackfoot, Blackfoot River			2,000
Bonners Ferry, Skin Creek			1,300
Burley, Barrett Springs			400
Clagstone, Beaver Lake			1,500
Cocolala, Fish Creek			800
Coeur d'Alene, Borenger Creek			400
Franklin, Cub River			2,000
Hailey, Johnson Creek			400
Nitsches Pond			400
Hauser, Succor Lake Creek			500
Hayden Lake, Hayden Lake			2,000
Juliaetta, Potlatch River			2,000
Kootenai County, Stallam Creek			800
Preston, Cub River			250
Priest River, Skookum Creek Pond			400
Soldier Creek			1,200
Mackay, Challis Creek			1,200
Garden Lake			1,500
Market Lake, Anderson's pond			800
Green's pond			1,200
Watson Pond			800
Marysville, Rock Creek Pond			500
Milner, Snake River			2,000
Montpelier, Bear Lake			2,000
Graham's pond			400
Grove Lake			1,500
Waterfall Spring Creek			400
Rathdrum, Boeck Creek			400
Downs Creek			400
Ersch Creek			400
Fish Lake Creek			1,300
Gilbert Creek			400
Greisch Creek			400
Hecks Creek			400
Lancaster Creek			400
McCarty Creek			400
Nelson Creek			400
Sexton Creek			400
Shauer Creek			400
Thorp Creek			400
Twin Lake Creek			500
Shoshone, Clear Creek			900
Devils Corral Lake			700
Soda Springs, Ledge Creek			400
Reinhart Lake			400
Swan Lake			500
Upper Chub Springs			400
Woodall's lake			1,000
St. Anthony, Drake's pond			400
Eastern Brook Pond			500
Lower Sand Creek Lake			1,500
Paradise Springs			800
Pine Canyon Lake			800
Spring Run			400
Illinois:			
Fox, Crystal Spring Pool			500
Indiana:			
Angola, Butler Creek			1,000
Killridge Creek			1,000
Attica, Pine Creek			1,000
Iowa:			
Cresco, Baldwin Creek			2,000
Rutherford Spring Brook			1,000
Hopkinton, Buck Creek			4,500
Lansing, Clear Creek			4,500
Village Creek			3,000
McGregor, Bactell Creek			4,500
Boss Creek			4,500
Manchester, Spring Branch			2,250
Postville, Spring Branch			1,500
Waukon, Yellow River, North Fork			4,500
Kansas:			
Eskridge, Spring Pond			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maine:			
Alfred, Nason's pond		15,000	
Bethel, Songo Lake		25,000	
Bigelow, Dead River, North Branch		20,000	
Bingham, Row Pond			5,000
Bryant Pond, Bryant Pond			1,500
Indian Pond			1,200
Lake Christopher		25,000	1,500
Twitchell Pond			1,500
Camden, Canaan Lake		25,000	1,500
Clinton, Brunners Brook			800
Twelvemile Creek		25,000	
Craig Brook, Woods Pond		8,000	
Cumberland Junction, Sturdivant's pond			300
Danville Junction, Sabbath Day Lake		35,000	
Dedham, Branch Pond		50,000	
Green Lake		75,000	
Phillips Lake		20,000	
East Newport, Grays Pond			900
East Orland, Billings Pond		25,000	
Ellsworth, Pattens Pond		25,000	
Ellsworth Falls, Beech Hill Pond		35,000	
Farmington, Beal Pond			1,000
Big Island Pond			2,000
Dead River Pond		30,000	
Grant Pond			2,000
Ell Pond			2,000
Mount Blue Pond		25,000	
Sucker Brook and Bishop's pond		20,000	
Tufts Pond		30,000	
Franklin, Narraguagas Lake			1,300
Spring Run		30,000	
Franklin Road, Blunts Pond		20,000	
Freeport, Joe True Brook			500
Winniesam Pond		8,000	
Grand Lake Stream, Dobsis Lake		9,000	
Grand Lake		33,437	
Great Brook, Green Lake		50,000	
Greenville Junction, Ragged Lake			1,400
Holeb, Holeb Lake		28,500	
McKinney Pond			800
McRitchie's pond		20,000	
Jackman, Attean Lake		20,000	
Little Big Wood Lake		25,000	
Katahdin Iron Works, Little Houston Pond			3,000
Kineo, Moosehead Lake		43,800	
Kingfield, Tufts Pond			1,400
Locke Mills, North Pond			19,850
Round Pond			21,550
South Pond			1,900
Mechanic Falls, Lake Thompson		40,000	
Monmouth, Purgatory Lake			1,300
Sand Pond			1,200
Maine Fish Commission	300,000		
New Gloucester, Sabbath Day Lake		20,000	
Norcross, North Twin Lake		40,000	
North Belgrade, Lake Messalonkee		3,000	
Oquossoc, Rangeley Lakes		70,000	1,500
Otis, Green Lake		19,500	
Oxford, Halls Pond			700
Phillips, Carleton and Lufkin Ponds			2,000
Grindstone Pond		20,000	
Presque Isle, Arnold Brook			700
Presque Isle Creek			1,300
Squawpan Lake			2,400
Rangeley, Rangeley Lake			1,500
Rockland, Meadow Brook			800
Skowhegan, Hayden Lake			1,500
South Berwick, Cummings Pond			600
South China, China Lake		20,000	
South Paris, Marshall Pond		20,000	
Shagg Pond			1,200
Twentymile River		25,000	
Washburn Pond		10,000	
Springdale, Littlefield's pond		13,500	
Strong, Sweets Pond			1,200
Union, Crawfords Pond			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maine—Continued.			
Waldoboro, Kaler Pond		20,000	
Levensaler Brook		20,000	
Warren, Oyster River			800
West Paris, Abbot Pond			1,200
Hicks Pond			1,200
Little Concord Pond			1,000
Overset Pond			1,200
Winslows Mills, East Brook		8,000	
Maryland:			
Baltimore, Maple Lake			500
Rose Bank Spring		6,600	
Bel Air, Boannans Branch			500
Coale Branch			500
Finney's pond			400
Forward Branch			500
Hickory Branch			500
James Run			500
Livezey Branch			500
Martins Branch			500
Minefield Branch			700
Swezay Branch			500
Brooklandville, Beaver Dam			1,200
Cockeysville, Oregon Branch			800
Cumberland, Warrior Run			800
Deer Park, Altamont Springs			500
McGraw's pond			2,000
Elkridge, Rockburn Branch			1,400
Frederick, Fishing Creek			800
Freeland, Crystal Springs			400
Garret County, Crystal Lake			200
Germantown, Buckstones Branch			600
Glyndon, Bloomfield Limestone Run			1,000
Western Run			700
Hagerstown, Harbaughs Run			400
Lannear Springs			1,600
Marsh Run			300
Linden, Edwood Brook		7,000	
Monkton, Beattys Brook			600
Bohman Branch			500
Nelson Branch			600
New Freedom, Gunpowder River, branch			600
Oakland, Lake Beulah			600
Lake Bryan			500
Parkton, Fourth Mile Run			1,200
Pen Mar, Glen Aften Run			500
Rockland, Slaughter-house Run			500
Sharon, Deer Creek			1,500
Stirrup Run			600
Stevenson, Rockland Branch			1,600
Thurmont, Little Hunting Creek			1,200
Washington Junction, Souder's pond			500
Watervale, Winters Run			1,200
Woodstock, Browns Branch			500
Massachusetts:			
Conway, Lowell Pond		3,000	
East Holliston, Meadow Brook		3,500	
Fitchburg, Allison's pond		3,000	
Willard Brook			2,000
Witch Brook			1,500
Greenfield, Strange Brook		5,000	
Hoosac Tunnel, Hewat Ponds			500
Hyannis, Perry Brook		3,000	
Lakeville, Bates Brook		3,500	
Leominster, Wekepekee Creek			1,200
Lynnfield Center, Fosters Pond		3,000	
Spauldings Brook		5,000	
North Dana, Rand Brook		6,000	
Swift River		8,000	
North Grafton, Bummit Brook			1,000
Northampton, Ahearns Brook			1,300
Welch Brook			1,300
Springfield, Watershops Creek		10,000	
Walpole, Lewis Pond		5,000	
Waltham, Stony Brook		12,000	
Wareham, Harlow Brook		3,500	
Westfield, Farmington River			1,200
Munns Brook			1,500
Whatley, Roaring Brook		5,000	500
Williamsburg, Pinegrove Pond		3,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan:			
Alpena, Beaver Creek		16,000	
Brush Creek		12,000	
Bullock Creek		8,000	2,000
Davis Creek			2,000
Moffet Creek		8,000	
Muskrat Creek		8,000	
Newton Creek		10,000	
Thunder Bay River		20,000	
Battle Creek, Cedar Creek			1,000
Hilmers Brook			1,000
Mingus Brook			1,000
Pigeon Creek			1,000
Sevenmile Brook			1,000
Bellaire, Cedar River			2,000
Biteley, Marquette River			5,000
Butternut, Butternut Creek			1,000
Central Lake, Ogletree Creek			2,000
Dundee, Willow Brook		4,000	
East Tawas, Au Gres River		20,000	
Pine River			6,000
Silver Creek		20,000	
Frederic, Au Sable River, South Branch			5,000
Gaylord, Pigeon River			5,000
Sturgeon River, West Branch			5,000
Grayling, Tillula Lake		12,000	
Hanover, Thompson Creek			1,000
Hastings, Cedar Creek			1,000
Glass Creek			1,000
Bank Creek			1,000
Last Chance Creek			1,000
Little Thornapple Creek			1,000
Mud Creek			1,000
Interlochen, Betsy River			2,000
Ironwood, Beaver Creek			3,000
Big Coon Creek			4,000
Honeymoon Creek			3,500
McDonald Creek			4,000
Triplett Creek			5,000
Willow Creek			4,000
Jackson, Oakcroft Lake			1,000
Kingsley, Boardman River			2,000
East Creek			1,000
Mayfield Brook			1,000
Lewiston, Hunt Creek		16,000	
Lovells, Au Sable River, North Branch			3,175
Marquette, Silver Creek			5,000
Mayfield, Bordman River			15,000
Newaygo, Biglow Creek			2,000
Oden, Minnehaha Creek			1,000
Owosso, Boyds Creek			500
Looking Glass River			500
Maple River			500
Peacock, Little Manistee River			5,000
Roscommon, Angus Brook		8,000	
Au Sable River			5,000
Beaver Creek		10,000	
Big Creek		10,000	
Campbells Creek		10,000	
Chilson Falls Creek		8,000	
Deer Creek		12,000	
Flanders Brook		10,000	
Goodwater Creek		8,000	
Hudson Creek		8,000	
Jenison Creek		8,000	
Mink Run		8,000	
Squirrel Creek		12,000	
Rose City, Houghton Creek		8,000	
Simmons Creek		8,000	
Wilkins Creek		8,000	
Thompsonville, Little Betsy River			6,125
Turtle Junction, Beatons Lake			10,000
Vanderbilt, Sturgeon River			5,000
Watersmeet, Beaver Spring Lake			8,000
Wingleton, Dannaher Creek			4,000
Sweetwater Creek			4,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Minnesota:			
Brainerd, Pillager Run			4,000
Carlton, Blackhoff Creek			4,500
Chicago Bay, Brule River			8,000
Flute Reed River			6,000
Detroit, Shady Brook			3,000
Duluth, French River			1,600
Lester River, North Branch			1,600
Eyota, Bear Creek			4,500
Goodland, Spring Brook			3,000
Houston, Badger Creek			1,500
Knife River, Baptism River			9,000
Beaver River			8,500
Gooseberry River			4,000
Knife River			9,000
Little Beaver Creek			4,000
Nigadoo Lake			10,000
Split Rock River			9,000
Stewart River			8,000
Lamoille, Big Trout Creek			3,000
Lanesboro, Gribbens Creek			1,500
Old Dusdree Creek			3,000
Lewiston, Rush Creek			4,500
Stockton Creek			4,500
Whitewater Creek, Middle Branch			4,500
Whitewater Creek, North Branch			4,500
Plainview, Beaver Creek			3,000
West Indian Creek			3,000
Preston, Camp Creek			4,500
Duschee Creek			3,000
Gribben Creek			3,000
North Branch Creek			3,000
Partridge Creek			3,000
South Branch			1,500
Sugar Creek			3,000
Tookelson Creek			3,000
Trout Run			3,000
Watson Creek			4,500
Weisel Creek			4,500
Willow Creek			4,500
Rollins Siding, Bates Creek			4,000
Rushford, Berlands Spring			1,500
Camp Creek			3,000
Choice Creeks			6,000
Coolidge Creek			1,500
Dalys Creek			3,000
Enterprise Creek			1,500
Ferguson Creek			1,500
Gaffney Creek			1,500
Gribben Creek			3,000
Hemmenway Creek			1,500
Iverson Creek			3,000
Johnson Creek			1,500
Meades Creek			3,000
Onsline Creek			3,000
Pine Creek			3,000
Rush Creek			3,000
Upheim Creek			3,000
Voagen Creek			3,000
Wiscoy Creek			1,500
Spring Valley, Kingsley Creek			1,500
Stockton, Rollingstone Creek			3,000
St. Charles, Campbells Springs			1,500
Carter Run			3,000
Pine Creek			3,000
St. Charles Creek			4,500
Trout Run			4,500
Whitewater River, Middle Branch			4,500
Whitewater River, North Branch			4,500
Whitewater River, South Branch			9,000
Tower, East Two Rivers			1,600
Two Harbors, Knife River, Middle Branch			4,500
Winona, Bear Creek			3,000
Burnes Valley Creek			3,000
Cedar Creek			4,500
Chimney Rock Valley Creek			3,000
Corey Valley Creek			3,000
Dearings Valley Creek			3,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Minnesota—Continued.			
Winona, East Burns Valey Creek			4,500
Gilman Valley Creek			3,000
Harvey Creek			3,000
Hauser Valley Creek			3,000
Hicks Valley Creek			4,500
Homer Valley Creek			3,000
Loffenlingen Valley Creek			3,000
Middle Valley Creek			3,000
Money Creek			4,500
Pleasant Valley Creek			4,500
Richmond Valley Creek			1,500
Speltz Valley Creek			4,500
Straight Valley Creek			3,000
Wiscoy Valley Creek			4,500
Montana:			
Alder, Granite Creek			1,800
Anaconda, Saele Gulch Pond			300
Montana Fish Commission			2,000
Armstead, Horse Prairie Creek			2,000
Willow Creek			1,800
Belt, Marguerite Pond			300
Browns Station, Browns Lake			1,500
Butte, Canty's pond			300
Chester, Big Sage Creek			2,000
Laird's ponds			1,900
Rosefield Lake			1,500
Crabtree, Spring Creek Pond			500
Thompson's spring			700
Dillon, Beaverhead River			2,000
Blacktail Deer Creek			2,000
Carter Creek			500
Poindexter Creek			400
Divide, Moose Creek			2,000
Peterson Creek			1,500
Peterson Pond			1,200
Rock Creek			250
Steel Creek			2,000
Swamp Creek			2,000
Upper Big Hole River			2,000
Woodworth Reservoir			1,000
Dodson, Lodge Pole Creek, East Fork			800
Electric, Cutler Lake			2,000
Eureka, Pinkham Creek			1,200
Flathead County, Little Kootenai River			1,500
Gardiner, Glen Creek			10,000
Willow Creek			20,000
Great Falls, Highwood Creek			2,000
Havre, Clear Creek			2,000
Helena, Beaver Creek			5,000
Tenmile Creek			2,000
Trout Creek			1,800
Kalispell, Ashley, Spring Creek			500
Miller's pond			800
Smiths Spring Creek			500
Spring Creek, West Fork			400
Vose Spring Creek			500
Lewistown, Big Spring Creek			2,000
Hanson Creek			1,000
Marcott Creek			1,000
Lima, Alderdice Spring			2,000
Little Sheep Creek			250
Truax Pond			2,000
Lo Lo, Lo Lo Creek			1,500
Maiden Rock, Moose Creek			2,000
Sixteen, Wanispa Creek Pond			2,000
Somers, Lake Ronan			2,000
Townsend, Big Spring			2,000
Deep Pond			3,000
Troy, O'Brien Creek			1,500
Round Lake			2,000
Twodot, Agnes Creek			2,000
Nebraska:			
Gordon, Wounded Knee Creek			24,000
Rushville, Whiteclay River			24,000
Nevada:			
Ely, Murry Creek			4,000
White River			4,000
Willow Creek			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New Hampshire:			
Bath, Ammonusuc River			2,000
Berlin, Millsfield Brook		6,000	6,000
Success Pond		15,000	
Canaan, Hains Brook		3,500	
Canobie Lake, Gordons Brook			800
Hittit Brook			1,000
Seaveys Brook			800
Concord, Ash Brook			1,200
Ben Hole Brook			1,200
Bow Brook Pond			1,500
Cloughs Brook			1,200
Fowler Brook			1,000
Lane Brook			1,500
Merrimac Brook			1,000
Piper Brook			1,500
Stumpfield Brook			2,200
Dover, Ham and Rumford Brook			2,000
Enfield, Butnam Brook			2,000
Committee Meadow Brook			1,500
Stow Brook			1,200
Exeter, Gig Mill Brook			1,000
Tuck Brook			1,000
Franklin, Call Brook		3,500	
Gulf Brook		3,500	
Mount Brook		5,000	
Putney Brook		3,500	
Grafton, Wild Meadow			2,000
Greenville, Adams Brook			1,000
Cold Spring Branch			1,000
Furnace Brook			1,000
Jowders Brook			800
Mansfield Brook			1,000
Moran Brook		8,000	
Richardson Brook		6,000	
Tenny Brook		8,000	
Henniker, Ammi Brook			1,200
Brown Brook			1,000
Colby Brook			1,000
Hill, Main Brook			1,000
Hillsboro, Pierce Brook		6,000	
Hillsboro County, Great Brook		6,000	
Keene, Ashuelot River, East Branch		20,000	2,000
Beaver Brook		7,000	1,200
Ferry Brook		6,000	
Hubbard Brook		8,000	1,000
Martin Brook		6,000	
Meetinghouse Brook			800
North Branch			1,500
Sturtevant Creek		5,000	
Wheeler Brook		3,500	800
White Brook		8,000	
Manchester, Bean Bog Creek		5,000	
Bedford Brook		8,000	
Goffstown Reservoir		3,500	
Manter Brook			1,000
Mt. Vernon Brook			800
Patten Brook		5,000	
Prescott Creek		3,500	
Sudden Pitch Brook			800
Sweetwater Brook		5,000	
Tahanta Pond			800
Marlboro, Shaker Brook		6,000	
Merrimack, Herrick Brook			1,200
Milford, Green Brook		5,000	
Hartshorn Brook		3,500	
Osgood Brook		10,000	1,000
Nashua, Bartimus Brook		5,000	800
Cider Mill Brook		6,000	
Dunklee Mill Pond		4,000	
Durant Pond			500
Flints Brook			1,000
Hale Brook		3,500	
Hassell Brook		5,000	
Holden Brook			1,000
Lydia Reed Brook		5,000	
Muskquash Brook		10,000	
Reed Creek			1,000
Silver Lake Creek			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New Hampshire—Continued.			
New Boston, Cole Brook		6,000	
Willow Brook		5,000	
Newport, Pinnacle Pond		3,500	
North Hampton, Little River		6,000	
North Weare, Putney Brook		3,500	
North Woodstock, Russell Pond		18,500	
Peterboro, Cold Brook			800
Taggott Brook			800
Portsmouth, Marston Brook			1,000
Potter Place, Cole Brook		3,000	
Cole Pond		8,000	
Rochester, Martha and Molly Brook			1,000
Somersworth, Tates Brook			800
South Merrimack, Woods Brook			1,200
Sunapee, Baptist Pond, tributary		3,500	
Ledge Pond, tributary		3,500	
Walpole, Houghton Brook and Great Brooks		6,000	
Warner, French Brook			1,200
Mill Brook and tributaries			1,000
Silver Brook			800
Stevens Brook			1,200
Warren, Berrys Brook			1,000
Black Brook			1,000
Patch Brook			1,000
West Concord, Crescent Reservoir			500
Wilton, Cold Brook		3,000	
East Goldsmith Brook		3,000	
Hodkins Brook		13,000	
Stony Brook		5,000	
Winchester, Roaring Brook			1,500
New Jersey:			
Homestead, Orange Mountain Springs			500
Hopewell, Mondels Brook			500
Ogdensburg, Sawmill Brook			500
Pattenburg, Manunselocwa Creek			700
Salem, Cool Run			500
Gibs Run			500
South Ogdensburg, Munson Brook			500
Sparta, Sparta Brook			700
New Mexico:			
Alamogordo, Fresinol Canyon Creek			400
Macy's pond			200
Portico Rico Pond			200
Chama, Chama River			14,000
Glorieta, Pecos River			3,000
Raton, Rayado River			10,000
Santa Fe, Waterworks Reservoir			3,500
New York:			
Addison, Tuscarora Creek		20,000	
Albany, French Creek		8,000	
Glen Lake		20,000	
Apulia, Carr Brook		8,000	
Cold Brook		8,000	
Conklin Brook		8,000	
Gallinger Brook		8,000	
Gleason Brook		8,000	
Grady Brook		8,000	
Hodges Brook		8,000	
Johnson Brook		8,000	
Keeler Brook		8,000	
Lee Brook		8,000	
Osborn Brook		8,000	
Vincent Brook		8,000	
Auburn, Cold Spring Brook		10,000	
North Brook		10,000	
Sennet Brook		10,000	
Bath, New York Forest, Fish and Game Commission		200,000	
Bliss, Wiscoy Creek		15,000	
Brisben, Christy Brook			800
Wyndom Brook			800
Cambridge, Colters Brook		10,000	2,000
Crystal Lake Brook		10,000	
Duel Hollow Brook		8,000	2,000
Lowery Brook		8,000	
Owl Kill Creek		12,000	
Robertson Brook			2,000
Spring Brook		8,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New York—Continued.			
Childwold, Chatamount Pond		20,000	
Lake Massawepie		20,000	
Cincinnatus, Otselic Creek			1,500
Constantia, Farrington Creek		8,000	
Kibbie Creek		10,000	
Scriba Creek		12,000	
Delhi, Elk Creek			800
Platners Brook			800
Dryden, Virgil Creek			1,000
Greene, Genegaustlet Creek			1,200
Wheeler Brook			700
Halfway, Carpenter Brook		10,000	
Highland Falls, Bog Meadow Brook			800
Queensboro Creek			1,000
Hunter, Pelham Creek		18,000	
Iona Island, Doodletown Creek			700
Lake View, Trout Brook			500
Trout Lake			700
Liberty, Spring Brook			800
Napanoch, Yama-No-Uchi Lakes			500
Newfield, Cayuga Inlet, West Branch		10,000	
New Lebanon, Shaker Brook		10,000	
Wyomorock Creek		15,000	
New York, New York Aquarium	5,000		
Northville, Charley Lake			1,000
Oneida, Cawasselon Creek		10,000	
Oneida Creek		20,000	
Oneonta, Otego Creek			6,500
Otego, Ouleont Creek			3,500
Otter Lake, Purgatory Creek		8,000	
Owego, Owego Creek, West Branch			1,500
Patterson, Croton River			1,800
Quaker Brook			800
Port Henry, Hatch Pond Brook		8,000	
Lindsey Brook		10,000	
Marsh Bird Brook		8,000	
Schroon River		36,000	
West Mill Brook		10,000	
Raquette Lake, Beaver Brook		8,000	
Loon Brook		8,000	
Richfield Springs, Tunnicliff Creek		8,000	
Rome, Mohawk River, West Branch		10,000	
Solon, Holden Brook			500
Millrim Brook			500
Stittville, Frey's pond		5,000	
St. Regis Falls, East Brook		10,000	
Syracuse, Judd Brook		8,000	
Montfredy Creek		10,000	
Thurman, Big Brook		8,000	
Harrington Brook		8,000	
Millington Brook		8,000	
Watertown, Cemetery Brook		15,000	
Mill Creek		10,000	
Waterville, Oriskany Creek, East Branch		8,000	
Oriskany Creek, South Branch		8,000	
West Winfield, Cedar Creek		8,000	
Morgan Brook		8,000	
Palmer Brook		8,000	
Spring Brook		5,000	
Unadilla Creek		10,000	
Whitney Point, Nanticoke Creek, West Branch			3,500
Williamstown, Salmon River		40,000	
North Carolina:			
Black Mountain, Long Branch			1,500
North Branch			1,500
Sugar Fork Creek			1,500
Boonford, Tudies Creek			5,000
Turtle Bluff Creek			3,000
Bostic, Brier Creek			3,000
First Broad River			5,000
Brevard, Allisons Creek			5,000
Hamilton Mill Pond			4,000
Mill Creek			10,000
Bryson City, Tarka Creek			3,500
Bushnell, Sawyer Creek			2,500
Calvert, Glady Fork Creek			5,000
Weavers Creek			5,000

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
North Carolina—Continued.			
Cranberry, Anthena River			500
Powder Mill Creek			3,000
Franklin, Locust Tree and Rough Fork creeks			3,000
Wahyah Creek			3,000
Green Mountain, Pig Pen Creek			1,500
Hendersonville, Brittains Creek			5,000
Morganton, Craigs creek			8,000
Cranberry Creek			3,000
Harper Creek			1,000
Horsepen Creek			8,000
Little Buck Creek			5,000
Raiders Camp Creek			3,000
Ripshin Creek			3,000
Rose Creek			7,000
Steeles creek			5,000
Upper Creek			10,000
Winding Stair Creek			3,000
Mortimer, Gragg Prong Creek			5,000
Harper Creek			2,000
Murphy, Board Tree Gap Creek			3,000
Johnson Creek			5,000
Little Fire Creek			5,000
Rock House Creek			3,000
Valley River			2,000
Old Fort, Yelland Creek			2,000
Penrose, Little River			800
Pineola, Camp Creek			7,000
Raleigh, McCullers Lake			1,400
Relief, Griffith's pond			1,000
Toecane, Stagger Weed Creek			500
Waynesville, Big Pigeon River			1,200
Zirconia, Rock Creek			5,000
Ohio:			
Akron, Adams Pond		4,000	
Babb's spring brook			1,000
Bellefontaine, Macochee Creek		12,000	
Spring Branches		12,000	
East Claridon, Sunny Bank Pond		4,000	
Glenmont, Locust Lick Run		8,000	
Mansfield, Mercer Run			2,000
Mantua, McMillan Creek		8,000	
Mt. Vernon, Lake Isabel		4,000	
Painesville, Old Orchard Pond			1,000
Petersburg, Maple Grove Pond		4,000	
Ravenna, Spring Runs		8,000	
Solon, Sandrock Springs		8,000	
Twinsburg, Hawthorn Pond			500
Willoughby, South Pond		4,000	
Oregon:			
Falls City, Berry Creek		2,000	
Gaston, Tualatin River, South Fork		5,000	
Hood River, Green Point Creek		3,000	
Hood River, West Fork		4,000	
Medford, Bone Creek		3,000	
Fourmile Lake		3,000	
Milwaukee, Crystal Lake		2,000	
Spring Creek		2,000	
New Era, Beaver Creek		5,000	
Parrott Creek		4,000	
Oakland, Calapoya River		6,000	
Ontario, Oregon Fish Commission	75,000		
Pendleton, Birch Creek		5,000	
McKay Creek		5,000	
Portland, Oregon Fish Commission	235,000		
Roseburg, Buckhorn Creek		3,000	
Pennsylvania:			
Allentown, Hellfirch Spring			2,800
Minsi Spring Pond			700
Altoona, Ashville Run			800
Big Laurel Run			800
Burgoon Run			800
Chondrin Run			1,000
Denimaree Run			1,000
Fetters Run			1,000
Forshey Run			500
Green Spring Run			800
Juniata Gap Run			800

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Altoona, Mill Run			2,300
Plack Run			800
Sandy Run			800
Tub Run			800
Ambler, Pennypacker Creek			500
Ashland, Hoofnagle Creek			1,000
Linville Creek			600
Roaring Creek			600
Austin, Alex Branch			1,000
Bark Shanty Run			700
Big Moores Run			1,000
Dearing Run			800
East Fork Creek			1,200
Freeman Run			1,200
Freeman Run, West Branch			800
Hammersley Fork Creek			1,200
Jones Run			700
Little Moore Run			800
Moore Run			1,200
Nelson Run			1,000
Portage Creek			800
Prouty Creek			800
Sinnemahoning Creek			1,200
South Fork Creek			1,000
South Woods Branch			1,200
Bedford, Hughes Run			500
Shovers Run			800
Trout Run			500
Beech Creek, Big Run, East Branch			1,000
Big Run			1,000
Furnace Run			600
Monument Run			800
Nestlerode Run			800
Scootac River, North Fork			1,000
Scootac River, South Fork			1,000
Spring Lick Run			800
Twin Run			800
Bellefonte, Buffalo Run			1,000
Benton, Benjamin Brook			800
Brink Run			600
Colley Brook			500
Dildine Run			500
Fair Ground Run			500
Fishing Creek			1,500
Green Creek			1,000
Harrington Brook			500
Lewins Run			500
Little Fishing Creek			1,500
Little Spencer Creek			1,500
McHenry Brook			500
Roberts Run			800
Spencer Run			600
Swartwood Creek			500
Travelpiece Creek			500
Berlin, Blue Lick Creek			1,000
Brush Creek			2,700
Buffalo Creek			1,000
Hogger Creek			800
Juniata Creek			1,200
Laurel Creek			1,000
Stony Creek			1,200
Ware Run			1,800
Blandon, Spring Creek			700
Bodine, Murray Run			800
Salt Run			800
Slack Run			700
Bradford, Chapel Fork Creek			1,200
Marilla Brook			1,000
Sugar Run			1,200
Tunagawant Creek, West Branch			1,000
Willow Creek			1,500
Brookland, Pine Creek			800
Bucks County, Rodgers's pond			500
Bushkill, Toms Creek			1,000
Carlisle, Letort Spring			1,400
Lines Run			800
Mallister Run			500

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Carlisle, Martin Run			600
Spruce Run			500
Whiskey Spring Run			600
Yellow Breeches Creek			1,500
Chambersburg, Birch Run			8,000
Carbaugh Run			2,850
Hoosic Run			2,850
Cherry Tree, Beaver Run			1,000
Cush Cushin Creek			1,000
Hazlet Run			800
Moors Creek			500
Peg Run			800
Shryock Run			1,000
Clarks Summit, Falls Creek			800
Gardners Creek			800
Clearfield, Albert Run			300
Alder Run			600
Alex Branch			500
Amons River			600
Bald Hill Run			300
Barnett Run			300
Baughman Run			300
Bear Wallow Run			300
Bee Hollow Run			400
Beers Run			300
Big Lick Run			800
Big Montgomery Run			500
Big Moose Run			600
Big Trout Run			800
Billotto Run			800
Birch Run			300
Bish Run			300
Blooms Run			300
Bluebell Run			500
Bowmans Run			300
Browns Run			300
Butler Run			300
Camp Poke Run			400
Carley Run			300
Carnes Run			300
Carrs Run			500
Chase Run			300
Christs Run			300
Cold Stream			500
Condrit Run			300
Crooked Run			400
Crooked Sewer Run			300
Cupler Run			300
De Beck Run			300
De Lay Branch			300
Deer Creek			1,100
Dickson Run			900
Downey Run			300
Dry Hollow Run			600
Dunlap Run			400
Eberts Run			300
Elder Run			400
Falls Run			300
Fern Branch			300
Fivemile Run			300
Flegal Moose Run			300
Flint Hollow Run			300
Fork Run			800
Garden Draft Run			300
Gifford Run			600
Graham Run			300
Gum Swamp Run			300
Hains Run			300
Hampton Run			300
Haney Run			300
Harry Branch			400
Hollow Branch			300
Hornes Shanty Branch			300
Hortanhalls Run			300
Hublers Spring Run			300

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Clearfield, Irwin Run			300
Jury Run			300
Kephart Run			300
Kethkart Run			300
Klines Run			300
Kooyer Run			300
Lambs Run			300
Leigey Run			300
Lenders Run			300
Little Run			300
Little Deer Creek			400
Little Lick Run			300
Little Moose Run			300
Little Trout Run			600
Lone Run			300
Lone Buck Run			400
Lone Rock Run			300
McCorkle Run			300
McDonald Run			300
McGomery Run			300
Mains Run			300
Mease Run			300
Merretts Run			300
Mignot Run			300
Molasses Bottle Run			300
Morgan Run			800
Mosqui to Creek			800
Murray Run			300
Norris Run			400
Ogden Branch			300
Ogden Run			300
Pickles Run			300
Pine Hollow Run			600
Pine Swamp Run			300
Pitch Pine Run			300
Potterdale Run			400
Raccoon Run			400
Rankin Run			300
Rattlesnake Run			300
Reed Run			300
Rocky Branch Run			300
Rock Halter Run			500
Rock Hollow Creek			300
Roberts Run			300
Sanbourne Run			500
Sand Run			300
Sandy Run			800
Schucker Run			300
Shans Run			300
Shopes Run			300
Single Tree Run			300
Sixmile Run			400
Smith Run			300
Spense Run			300
Spruce Island Run			400
Stones Run			500
Stoneville Run			300
Stone Hammer Run			300
Stone Quarry Run			300
Stony Battery Run			300
Stotts Run			300
Stump Lick Run			300
Sulpage Run			300
Surveyor Run			400
Sylvas Run			300
Tar Run			400
Tarkill Run			300
Thomas Run			1,000
Thompson Run			400
Thompson Reed Run			300
Toppers Run			300
Turners Run			600
Twelvemile Run			600
Tyler Run			300
Upper Buck Run			500
Walkers Run			300
Walnut Hollow Run			300

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Clearfield, Welder Swamp Run			300
Wiser Run			300
Witch Hazel Creek			300
Wolf Run			300
Woods Run			400
Cold Springs, Pine Swamp Run			1,000
West Branch			1,000
Coles Creek, Black Ash Run			600
Coles Creek			1,000
Fritz Brook			500
Hartman Brook			500
Connellsville, Fulton Run			800
Tates Run			800
Coudersport, Allegheny River			1,000
Ayers Hill Branch			600
Baker Creek			700
Dingman Run			700
Dodd Creek			700
Dwight Creek			700
Lehman Run			700
Mill Creek			800
Moores Run			800
Prouty Run			800
Reed Run			700
South Branch			1,000
Sunken Branch			800
Cresco, Broadheads Creek			600
Buck Hill Creek			500
Cressona, Beaver Valley Creek			700
Curry, Potter Creek			500
Spring Run and Popper Creek			800
Three Springs			800
Three Springs Run			500
Yellow Creek			500
Delta, Fishing Creek			800
Fulton Run			700
McLaughlin Branch			500
Neal Run			1,000
Denver, Sudocks Creek			500
Downington, Davis Run			500
Rock Run			500
Du Bois, Anderson Creek			1,500
Big Montgomery Run			1,000
East Branch			1,000
Little Montgomery Creek			1,000
Norris Creek			1,000
Stoney Run			1,000
Wolf Creek			1,200
Eagle Rock, Culbertson Run			600
Martin Run			600
Muskrat Run			600
Ebensburg, Abrams Run			500
Ben Evans Creek			1,000
Blacklick Creek			1,500
Chest Creek			1,000
Conemaugh Creek			800
Davis Run			500
Evans Run			500
Jones Creek			500
Kerchner Creek			500
Noels Run			500
Powell Run			500
Roaring Run			500
Roberts Run			500
Spruce Run			500
Stewart Run			500
Stone Run			500
Williams Creek			500
Emporium Junction, Clear Creek			1,000
Driftwood Creek			1,200
Fourmile Run			800
North Creek			800
Portage Creek			1,200
Salt Run			1,000
Forks, Huntingdon Creek			1,500
Whitenights Run			500
Freeport, Boles Run			500
Cornplanter Run			700

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Gaines Junction, Elk Run			1,000
Elk Run, West Branch			700
Pine Creek			2,000
Gap, Houstons Creek			600
Livingston Run			800
Green Hill, Trout Pool			500
Halifax, Swamp Run			800
Hallstead, Wiley Creek			800
Hickory, Otter Creek			800
Honesdale, Big Brook			800
Carley Brook			800
Carley Brook, West Branch			600
Lackawaxen Creek			1,000
West Dyberry Creek			1,000
Hopewell, Maple Run			800
Marble Run			500
Sandy Run			500
Houtzdale, Beaver Run			800
Brushy Run			600
Clear Run			500
Coal Run			800
Kettle Run			500
Morgan Run			1,200
Moshannon Creek			1,200
Mountain Branch			1,000
Trume Root Creek			800
Van Dusen Creek			500
Wilson Run			800
Hull, Horton Run			700
Jamison Creek			800
Stone Lick Run			800
Wild Boy Run			800
Huntingdon, Standing Stone Creek			1,000
Stone Creek			1,500
Stone Creek, East Branch			1,000
Trough Creek			1,000
Jamison City, Blackberry Run			800
Bloody Run			500
Coles Brook			1,000
Fishing Creek, East Branch			1,000
Grassy Meadow Brook			1,000
Joanna, Brinley Run			600
Johnstown, Baker Run			800
Bens Creek			1,000
Breast Works Run			800
Gray Run			1,600
Hinckson Run			800
Laurel Run			800
Mill Creek			1,000
Sarlouises Spring			500
Keating Summit, Cowley Run			800
Dempsey Run			1,000
Planing Mill Run			500
Portage Creek, North Branch			1,200
Portage Creek, South Branch			800
Sinnamahoning Creek			800
Kimbles, Kimbles Brook			800
Kiskiminetas, Kiskiminetas Spring			500
Laubachs, Kile Spring Run			500
Long Brook			500
Meeker Run			500
Lebanon, Bachman Run			1,500
Bear Creek			500
Beck Creek			500
Bennets Creek			500
Buffalo Springs			500
Fishing Creek			500
Hanner Creek			500
Indian Town Gap Creek			1,000
Lasers Creek			500
Mount Hope Creek			500
Oil Mill Run			500
Pine Swamp Creek			700
Poplar Run			700
Tulpehocken Creek			700
Lehighton, Wild Creek			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Ligonier, Bunger Springs			500
Laughlinstown Run			800
Lins Run			800
McGinnis Run			1,000
Mill Creek			1,000
Loch Haven, Bagley Run			600
Black Hollow Run			600
Brewer Run			500
Bull Run			800
Burges Run			500
Cedar Run			800
Cherry Run			1,600
Clarks Run			500
Craig Run			500
Eady Run			500
Earons Run			500
Echer Run			500
Ferney Run			800
Fernus Run			500
Goulds Run			600
Grows Run			600
Hanna Run			800
Hurds Run			500
Jerry Run			600
Johnson Run			800
Little Bagley Run			500
Little Plum Run			500
Lusk Run			800
McCloskey Run			500
McElhattan Run			500
McKauge Run			600
Marcher Run			500
Mill Run			1,300
Muddy Run			500
North Fork Run			1,100
Pacher Run			600
Plum Run			800
Queens Run			1,400
Ram Run			1,000
Reed Run			600
Robins Run			500
Schootac Run			1,000
Shingle Run			600
Slab Run			500
South Fork Run			1,100
Spring Lick Run			500
Sugar Run			800
Swiss Run			500
Tyler Run			500
Welsh Run			800
Wenher Run			800
Widman Run			500
Wild Run			500
Wolf Run			500
Lykens, Bear Puddle Run			800
Buck Run, West Branch			1,000
Hawk's Nest Run			1,000
Minich Hut Run			1,000
Mishler Run			500
Rattling Creek, East Branch			1,000
Stone Cabin Creek			800
Stone Heap Run			1,000
White Oak Run			1,000
McElhattan, Hennesy Run			600
Little Chathams Run			800
Plum Run			800
Mahanoy City, Codorus Creek			600
Locust Creek			1,000
Mance, Butterspring Run			500
Hutzell Run			600
Wills Creek			1,500
Marietta, Clarks Run			500
Evans Run			500
Gladfelter Creek			500
Halls Run			600
Markleton, Buck Run			800
Henry Clay Run			800

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Meadville, McKay Run			500
Mifflinburg, Buffalo Creek, North Branch			1,200
Buffalo Creek, South Branch			700
Coil Run			800
Cold Run			500
Lick Run			1,000
Limestone Run			500
Molls Hollow Run			500
Panther Run			800
Raritan Run			500
Reish Run			500
Smith Run			500
Sweitzers Run			700
Turtle Creek			700
Weiricks Gap Run			800
Mill Haul, Becks Run			500
Duck River			500
Dummss's pond			500
Fishing Creek			1,500
Fortneys Run			600
Hayes Run			500
Moslem, Leibelsperger Run			500
Mount Pocono, Indian Run Creek			600
Muddy Creek Forks, Toms Creek			800
Muncy, Muncy Creek			1,200
Nanticoke, Arnold Creek			800
Fades Creek			800
Harvey Creek			1,200
Hemlock Creek			1,000
Huntington Creek			1,000
Little Wapwallopen Creek			700
Mitchell Run			700
Peggie Hunter Creek			700
Pikes Creek			1,000
Shingle Run			700
Wapwallopen Creek			1,500
New Holland, Fisher Spring			500
Newton Hamilton, Licking Creek			1,000
Oak Hall, Cedar Creek			600
Spring Creek			1,200
Orangeville, Green Run			800
Little Green Creek			800
Mountain Brook			500
Spring Run			1,000
Stauders Run			500
Penn Haven Junction, Inakake Creek			1,000
Petersburg, Garners Creek			1,600
Globe Run			800
Harrys Run			800
Lick Run			800
Little Licking Creek			800
Smith Run			800
Philadelphia, Twin Brooks			500
Philipsburg, Benner Run			800
Big Spring Run			500
Bilger Run			500
Black Bear Creek			1,000
Black Moshannon Creek			1,000
Clover Run			600
Cold Stream			2,000
Dicks Run			800
Echo Glen Lake			400
Flat Rock Run			600
McCords Run			500
Seven Springs Run			500
Shields Run			600
Sixmile Run			1,000
Smays Run			600
Tomtit Run			600
Twiggs Run			500
Whitstone Run			500
Yocum Run			500
Pottsville, Black Creek			500
Cold Run			600
Eichert Creek			500
Indian Run			500
Jackson Creek			600

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Pottsville, Mill Creek			700
Miller Creek			600
Pine Creek			700
Schoehners Run			700
Spruce Creek			500
Stanley Creek			600
Strauss Creek			600
Tumbling Run			1,400
Tumbling Run Lake			3,000
Pulaski, Deer Creek			700
Punxsutawney, Sandy Creek			800
Reading, Brunnerkill Creek			1,000
Cacoosing Creek			1,000
Lauers Run			500
Moslem Creek			800
Reed Spring Creek			800
Spring Run			600
Willow Lodge Trout Pond			500
Reedsville, Tea Creek			500
Renovo, Caddy Run			1,000
Drury Run			4,000
Hall Run			2,000
Paddy Run			1,000
Reynoldsville, Cascade Run			800
Christie Run			700
Dean Run			800
Hughes Run			800
Keys Run			800
Kyle Run			800
McCreight Run			800
Mitchell Creek			800
Moore Run			800
Morrison Run			800
Newton River			600
Panther Run			800
Pitch Pine Run			700
Sevenmile Run			800
Trout Run			1,000
Rising Springs, Penns Creek			1,700
Royer, Brush Run			500
McAllister Run			1,000
Piney Creek			800
Sinking Run			500
Spring Run			800
Springdale Brook			500
Sandy Ridge, Bear Run			500
Beaver Run			800
Coal Run			600
Little Beaver Run			600
Milligan Run			500
Trout Run			1,200
Scottdale, Green Lick Creek			500
Shade Gap, Mills Run			800
Sheridan, Mill Creek			500
Shrewsbury, Deer Creek			1,100
Muddy Creek			600
Smethport, Barney Creek			800
Cogswell Brook			500
Daley Brook			800
Long Brook			600
Stanton Run			600
Wildcat Run			800
Spring Grove, Myers Pond			500
Stewardstown, Leibs Creek			800
Muddy Creek			600
Stillwater, Fishing Creek			1,500
Raven Creek			1,000
Stoyestown, Breastwork Run			800
Stroudsburg, Broadhead Creek			1,500
Little Pocono Creek			500
Mazzetti Run			600
Pensyl Creek			1,000
Pocono Creek			1,200
Sanio Creek			1,000
Slatter Creek			800
Smith Creek			500
Spragle Run			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Stroudsburg, Wigman Run			500
Susquehanna, Canawacta Creek			800
Drinker Creek			700
Egypt Creek			800
Hemlock Creek			800
Susquehanna County, Riney Creek			1,000
Susquehanna, Roaring Brook			700
Starrucca Creek			1,000
Wild Cat Brook			700
Temple, Laurel Run			800
Mount Laurel Lake			500
Tionesta, Bear Creek			500
Big Coon Creek			600
Dawson Run			500
Hemlock Creek			800
Hunter Run			500
Indian Camp Creek			500
Jamison Run			500
Johns Run			500
Little Coon Creek			800
Little Tionesta Creek			800
Sibble Run			500
Tubb Run			500
Towanda, Towanda Creek, South Branch			2,400
Trout Run, Grays Run			1,600
Steam Valley Run			500
Trout Run			800
Trout Run, East Branch			600
Trout Run, West Branch			500
Wolf Run			600
Troy, Cases Glen Creek			500
Corey Creek			500
Cosert Creek			500
Fan Brook Creek			500
Griffin Creek			600
Liona Creek			500
Miller Run			500
Palmer Creek			500
Porter Creek			1,100
Rathbane Creek			500
Roaring Run			500
Rye Run			500
Spaulding Creek			500
Sugar Creek			500
Sylvania Creek			500
Wallaceton, Bumbarger Run			600
Little Morgan Run			600
Moravian Run			600
Waterville, Bonnell Run			700
English Run			700
Lick Run			700
McVale Fork Creek			500
Otter Run			700
Pine Run			500
Texas Creek			800
Wolf Run			700
Wheelerville, Elk Creek			1,200
Elk Creek, East Fork			800
Whetham, Lick Run			1,000
Rattlesnake Run			2,000
Whitford, Hoffman Run			600
Williamsburg, Clover Creek			1,500
Meadow Brook			500
Winburne, Basin Run			1,600
Rollingstone Creek			800
Windber, Beaver Run			800
Cob Run			700
Poplar Run			1,000
Woodbine, Harmon Run			500
Ilgenfritz Run			800
Johns Creek			800
Kilgore Run			500
Rocky Run			1,000
Watson Branch			500
York, Dunker Valley Creek			1,500
Shener Run			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
South Carolina:			
Newry, Cane Creek			13,200
Pickens, Little Eastatoe River			5,000
North Saluda River			6,000
Oblenoy Creek			10,000
Pickens County, Cove Creek			7,000
Seneca, Bad Creek			3,000
Calys Creek			3,000
Cane Brake Creek			600
Cantrell's pond			1,800
Fall Creek			1,800
Writes Creek			3,000
West Union, Whitstone Creek			3,000
South Dakota:			
Belle Fourche, Stearns's pond			8,700
Custer, Laughing Water Creek			560
Lemmon Creek			560
Ruby Creek			560
Sidey's pond			10,000
Squaw Creek			560
Willow Creek			10,560
Deadwood, Bear Butte Creek			10,000
Elmore, Ice Box Creek			840
M. and M. Brook			8,000
Spearfish Creek			2,100
Hermosa, Barnes Creek			8,000
Cobb Lakes			8,000
Downen Lakes			22,000
Robertson Creek			10,000
Hill City, Pine Creek			1,700
Slate Creek			20,000
Spring Creek			30,000
Interior, Flesh Creek			20,000
Medicine Root Creek			14,000
Nemo, Box Elder Creek			10,000
Jim Creek			10,000
Pactola, Rapid Creek			26,700
Pluma, Whitetail Creek			700
Rapid City, Boland Creek			560
Gilbert's pond			6,300
Jackson's pond			6,300
Lime Creek			8,400
Lockhart Pond			8,000
Marshall Creek			8,000
Price's pond			6,000
Slate Creek			11,600
Rochford, Castle Creek			1,840
Silver City, Rapid Creek			25,000
Spearfish, Cox Lake			5,000
False Bottom Creek			950
McGregor Creek			10,000
Murray Spring Branch			8,000
Rogers Pond			5,000
Schmidt's pond			5,000
Spearfish Creek		100,000	150,000
Spring Creek			700
Spring Pond			5,000
Watercress Creek			700
Sturgis, Atkins Pond			8,000
Bear Butte Creek			18,500
Deadmans Canyon Creek			16,000
Silver Creek			560
Spring Creek			8,400
Tilford, Little Elk Creek			7,200
Tennessee:			
Fishery, North Indian Creek			376
Greenville, Jennings Creek			3,000
Pikeville, Glade Creek			7,000
Roan Mountain, East Cove Creek			5,000
Freeman Brook			5,000
Hampton Creek, North Fork			3,000
Tom Creek			5,000
Utah:			
Logan, Allen's pond			1,500
Cache Fish Brook			2,100
City Park Spring			1,500
Clear Spring			4,100
Davis Pond			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Utah—Continued.			
Logan, Humphreys's pond			1,000
Jacobsen's pond			1,500
Koller's pond			2,100
Spring Trout Creek			2,100
Valley View Trout Pond			2,500
Zippert's pond			2,100
Mendon, Northfield Spring			2,100
Murray, Spring Water Stream			2,100
Ogden, Jensen's pond			3,500
Little Spring Creek			2,100
Provo, Provo River			20,000
Spring Creek			1,200
Richfield, Sevier Lake			3,000
Meecham Pond			3,000
Williams Pond			2,000
Salt Lake City, Lund's pond			1,000
Scott Creek			2,800
Thistle Junction, Mountain Brook			4,500
Woods Cross, Pack's ponds			2,100
Vermont:			
Arlington, Battenkill Creek			5,000
Butternut Gutter Creek			3,000
Warm Brook			5,000
Whitman Brook			3,000
Barton, May Pond		30,000	
Roaring Brook		30,000	
Bellows Falls, Morse Brook		25,000	
Bennington, Furnace Brook			4,000
Robinson Brook		20,000	
South Creek			2,000
Brattleboro, Ames Brook			1,000
Auger Hole Brook			2,000
Broad Brook			1,000
Franklin Brook			3,000
Jacobs Brook			2,000
Liscom Pond			1,000
Stickney Brook			1,000
Sunset Lake			1,000
Tyler Brook			2,000
Whetstone Brook			2,000
Cuttingsville, Spring Lake			2,000
East Arlington, Warm Brook			2,500
East Wallingford, Maloney's creek		15,000	
Essex County, Dennis Pond			2,000
Forest Lake		30,000	3,000
Little Averill Lake		40,000	
Greensboro, Caspian Lake			6,000
Groton, Darling Pond		125,000	16,000
Island Pond, Ferrins Creek		40,000	
Johnson, Stirling Pond			1,000
Lyndonville, Vail Pond			5,000
Manchester, Batten Kill River			3,500
Batten Kill River, West Branch			2,000
Bourn Brook			1,500
Middlebury, Crystal Pond		45,000	
Middlesex, Kerin Brook		15,000	
Montpelier, Kennys Pond			2,000
Malny Brook			2,000
Stewart Brook			500
Yatter Pond			2,000
North Bennington, Barton Brook			1,000
Dewey Brook			700
Paran Creek		20,000	6,500
Northfield, Mill Hill Brook			500
North Pownal, Gardner Brook			1,000
North Underhill, Robinson's pond		15,000	
Norwich, Lake Mitchell		125,000	12,000
Pittsford, Sugar Hollow Brook			2,000
Plainfield, Lye Brook			1,000
Randolph, Adams Brook			1,000
Ayers Brook		35,000	
Chandler Brook		20,000	
Clough Brook			700
Cold Springs Brook			1,000
Guild Brook		20,000	
Gulf Brook		10,000	
Halfway Brook		10,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Vermont—Continued.			
Randolph, Howard Hill Brook		20,000	
Mafeba Lake		15,000	
Mud Pond		15,000	
Raspberry Brook		15,000	
Snow Brook		15,000	
Spear Brook		8,305	
Rutland, Atwood Meadow Brook			2,000
Castleton River			3,000
Cold River			5,000
Dunklee Brook		20,000	
East Creek			8,000
Furnace Brook		45,000	
Furnace River			2,000
Mendon Creek			3,000
Mill River			2,500
Osgood Brook			4,500
Pico Pond			6,000
School House Brook		20,000	
Shaftsbury, Marshall Brook			1,200
Spencer Brook			700
South Chittenden, Billings Brook			1,540
Chittenden reservoir			6,000
Hewitt Brook			1,920
Ripley Brook			1,540
South Ryegate, Gibson Brook		10,000	
McCall Brook		10,000	
South Vernon, Newton Brook			1,000
South Wallingford, Aldrich Brook			800
Otter Creek			2,000
St. Johnsbury, Blodgett Brook		15,000	500
Blodgett's pond			1,300
Frog Pond		13,000	1,000
Lawrence's ponds		20,000	
Meadow Brook		25,000	1,000
Sleeper River		25,000	3,000
Taftsville, Beaver Brook			1,000
Townshend, Big Brook			1,975
Mill Brook			1,975
Simpsonville Brook			1,975
Vergennes, Hewitt Brook			1,500
Vergennes Trout Club Pond			1,000
Wardsboro, Gleason Brook		15,000	
Waterbury, Lake Mansfield			10,000
Nebraska Creek			1,500
West Burke, Jobs Pond		30,000	
Long Pond		35,000	
West Hartford, Bugbee Sherburne Brook		10,000	
West Pawlet, Indian River			2,000
Wilmington, Benny Brook		20,000	
Williamstown, White River			1,000
Williamsville, Baker Brook		40,000	
Windsor, Walnut Grove Pond		15,000	
Woodstock, Beaver Brook			800
Beaver Meadow Brook			500
Cold Spring Brook			500
Crooker Brook			1,000
Crystal Pool			300
Lakota Lake			2,500
Moore Pond		30,000	
Virginia:			
Basic City, Baker Springs			800
Cherry Tree Springs			1,200
Big Stony Junction, Big Stony Creek			8,000
Lick Branch			2,500
Bremo, Red House Creek			400
Burke, Pohick Creek			1,200
Christiansburg, Mill Creek			2,500
Clifton Forge, Smith Creek			3,000
Clifton Station, Popes Head Creek			1,000
Covington, Bolars Run			2,000
Falling Spring Run			1,500
Shauvers Run			700
Valley Branch			700
Fairfax, Piney Branch			750
Fairfax County, McElroys Pond			500
Fries, Bridle Creek			6,000
Elk Creek			6,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Virginia—Continued.			
Glade Spring, Glade Creek			600
Harrisonburg, Long Run			3,500
Hunter, Snake Den Creek			800
Lynchburg, Candler Branch			200
Natural Bridge, Cedar Creek Dam			500
New Castle, Tub Run			1,500
Rockfish, Brook Creek			1,500
Round Hill, Beaver Dam Creek, South Fork			1,000
Saltville, Laurel Creek			5,000
Scottsville, Davis Creek Pond			200
Spout Spring, Davenport Branch			500
Stuarts Draft, Back Creek			4,000
Tip Top, Mud Fork Creek			2,000
Vienna, Beaver Lake			500
Winchester, Huck Dam			500
Washington:			
Asotin, Asotin Creek			2,000
Chehalis, Buchanan Creek			1,400
Bushs Lake		4,000	.....
Winston Creek			2,200
Index, Skykomish River, North Fork		10,000	.....
South Fork		10,000	.....
Kapowsin, Morgan Lake		3,000	.....
Lamana, Crab Creek			2,000
Molson, Teal Lake			1,000
Montesano, Satsop River		7.000	.....
Night Hawk, Fish Lake			2,000
North Yakima, Atanum River			2,000
Cowiche Creek			2,000
Cowiche Creek, South Fork			1,500
Natches Creek			2,000
Wenas Creek			1,800
Wide Hollow Creek			2,000
Orient, Pierre Lake			2,300
Seattle, Exposition Aquarium			13
Valley, Colville River			2,000
Wenatchee, Pattie's pond		2,000	.....
Spring Valley Pond		2.000	.....
West Virginia:			
Barton, Greenbrier River			6,000
Burner, Clubhouse Run			1,000
Harper Run			1,000
Little River			1,500
Span Oak Run			800
Capon Springs, Laurel Lake			2,100
Yellow Spring Run			1,000
Charlestown, Everetts Run			300
Cloverlick, Clover Creek			2,500
Durbin, Meadow Run			800
Elkins, Little Black Fork			5,200
Fort Spring, Turkey Creek			1,000
Gladwin, Nicholas Lane Run			1,200
Lowell, Kelleys Creek			700
Marlinton, Devers Creek			500
May, Glade Run			1,500
Orndorf Run			1,200
White Camp Run			1,200
Mill Creek, Cassity Fork Creek			2,000
Mill Creek			2,000
Morgantown and Kingwood Junction, Flag Run			2,000
Paw Paw, Critton Run			1,500
Point Mills, Battle Run			2,000
Seebert, Bruffey Creek			400
Cranberry Creek			24,000
Hill Creek			800
Sir Johns Run, Cold Run			700
Surveyor, Cone Creek Pond			500
Terra Alta, Big Wolf Creek			1,600
Dority Creek			1,500
Roaring Creek			2,000
Snowy Creek, North Fork			2,000
Snowy Creek, South Fork			2,000
Wardwell Creek			1,500
Webster Springs, Elk River			3,500
Leatherwood Creek			1,500
White Sulphur Springs, Spring Branch			380
Whitmer Gandy, Creek			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
West Virginia—Continued.			
Wildell, Elk Run			1,500
Greenbrier River, West Fork			2,500
Mikes Run			1,500
Winterburn, Buffalo Fork			800
Greenbrier River			800
Ram Bottom Run			500
Wisconsin:			
Alma Center, Ano Creek			1,500
Halls Creek			1,080
Amherst Junction, Waupaca River			1,500
Arcadia, Eagle Valley Creek			3,000
Rainey Valley Creek			520
Rapid Run			500
Rock Cut Creek			600
Silver Brook			600
Town Creek			700
Trempealeau River			800
West Branch			600
Augusta, Bears Grass Creek			720
Brown Creek			360
Coon Gut Creek			360
Diamond Creek			360
Hathaway Creek			360
Hay Creek			1,080
Horse Creek			720
Sand Creek			720
Tea Creek			360
Barneveld, Harris Creek			3,000
Lewis Creek			1,500
Moyer Creek			3,000
Barren, Millers Creek			800
Belgium, Klas Pond			1,000
Bennett, Poplar River			11,000
Birchwood, Branch Creek			1,440
Black River Falls, Allens Creek			2,100
Center Creek			900
Clear Creek			1,800
Dickens Creek			300
Kenyon Creek			1,800
Levis Creek			1,500
Pappoose Creek			1,800
Pine Creek			3,000
Roaring Creek			3,000
Slauser Creek			300
Smith Creek			1,500
Snow Creek			2,100
Spring Creek			1,500
Squaw Creek			3,600
Stein Creek			3,300
Stenelson Creek			1,500
Town Creek			1,800
Van Hersett Creek			2,100
Visneau Creek			3,000
Cable, Big Brook			720
Big Spring			360
Caps Creek			360
Garrison Brook			360
McDonald Creek			360
Namakagon River			1,080
Rogans Pond			360
Twin Creeks			360
Chippewa Falls, Duncan Creek			4,500
Stitson Creek			3,000
Cobban, Shaw Creek			1,500
Cochrane, Breham Creek			360
Bulls Valley Creek			360
Christ Rupp Creek			360
Dannser Valley Creek			360
Esbach Valley Creek			360
Florin Valley Creek			360
Irish Valley Creek			360
Johns Valley Creek			360
Mill Creek			360
Oak Valley Creek			360
Rebhahn Valley Creek			360

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Cochrane, Rose Valley Creek			360
Rutchow Creek			360
Schoubs Creek			360
Schoepp Valley Creek			360
Schultz Creek			360
Wolfs Valley Creek			360
Yager Creek			360
Colby, Popple Creek			720
Dodgeville, Anderson Creek			1,500
Bennett Stream			1,500
Berg Creek			1,500
Dickenson Stream			1,500
Flint Creek			1,500
Harker Creek			3,000
Otter Creek			1,500
Regan Creek			1,500
Venning Stream			510
Zander Creek			1,500
Douglas County, Bois Brule River			360
Downing, Beaver Creek			360
Sand Creek			360
Tiffany Creek			720
Durand, Alder Creek			1,500
Averill Creek			360
Barney Branch			1,500
Bear Creek			1,080
Big Missouri Creek			3,000
Crane Spring			1,500
Daily Creek			1,500
Everman Creek			3,000
Fox Creek			360
Hay Creek			1,500
Knicht Creek			3,000
Little Missouri Creek			1,500
Seitz Spring			1,500
Sinz Creek			1,500
Stouff Spring			1,000
Wilson Creek			400
Eau Claire, Coon Creek			1,440
Elk Creek			720
Fivemile Creek			720
Lows Creek			720
Otter Creek			1,440
Rock Creek			1,440
Sevenmile Creek			360
Taylor Creek			360
Trout Brook			360
Elcho, Spring Creek			1,500
Eleva, Big Creek			3,000
Hays Valley Creek			1,500
Trout Creek			1,860
Elk Mound, Big Elk Creek			3,000
Little Elk Creek			3,000
Popple Creek			1,500
Elmwood, Big Missouri Creek			4,500
Cady Creek			720
Case Creek			1,500
East Plum Creek			1,500
Little Missouri Creek			720
Plum Creek			5,220
Porter Creek			360
Elroy, Seymour Creek			510
Fairchild, Coon Creek			720
Gilberts Creek			360
McLaren Creek			720
Marvins Creek			360
Scott Creek			360
Tals Creek			360
Fall Creek, Bear Grass Creek			3,000
Beaver Creek			3,000
Fennimore, Fennimore Creek			4,500
Green River			3,000
Little Grant Creek			1,500
Fond du Lac, Sheridan Creek			1,500
Foxboro, Big Balsam Creek			4,000
Empire Creek			4,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings yearlings, and adults.
Wisconsin—Continued.			
Glenwood, Beaver Creek, North Fork			360
Beaver Creek, South Fork			720
Blues Creek			360
Bolen Creek			720
Bolen Creek, North Branch			720
Sand Creek, North Fork			720
Sand Creek, South Fork			360
South Tiffany Brook			360
Sullivan Creek			360
Grand Rapids, Chester Creek			1,500
Fivemile Creek			4,500
Harvey Creek			1,500
Twomile Creek			1,500
Greenwood, Black Creek			720
Hay River, South Fork			720
Norwegian Creek			720
Rocky Run			720
Gordon, Crotty Brook			2,500
Stony Brook			2,500
Mishe Makwa Trout Stream	50,000		
Weirs Brook			2,000
Harshaw, Bearskin Creek			3,000
Rice Creek			4,500
Hayward, Bean Brook			720
Bean Creek, North Fork			3,000
Godfrey Creek			3,000
Namakagon River			8,000
Hixton, Beaty Creek			720
Beaver Creek			1,500
Curran Creek			1,860
French Creek			1,500
Gaulster Creek			1,860
Hixton Pond			1,500
Holmes Creek			360
Judkins Creek			360
Larson Creek			1,500
Lowe Creek			1,600
Mortiboy Creek			1,500
Nolop Creek			720
North Branch			1,500
Pigeon Creek			3,360
Pine Creek, North Branch			360
Sand Creek			360
Schermerhorn Creek			1,500
Sechlerville Pond			3,000
Sheldon Creek			360
Sherwood Creek			1,500
Sly Creek			1,500
South Branch			1,500
Tank Creek			2,220
Timber Creek			3,000
Trempealeau River			3,000
Trempealeau River, South Branch			360
Hudson, Greens Race			360
Jeffersons Creek			360
Tenmile Creek			720
Willow River			720
Independence, Bennet Valley Creek			1,500
Borst Valley Creek			1,500
Burt Valley Creek			1,500
Chimney Rock Creek			1,500
Cookes Creek			1,500
Dennis Creek			1,500
Elk Creek			1,500
Finrights Creek			1,500
Gunderson Creek			1,500
Hawkinson Creek			1,500
Husselgard Branch			1,500
Maloney Creek			1,500
Olson Creek			1,500
Plum Creek			1,860
Rosko Creek			1,500
Simonson Valley Creek			1,500
Skogstad Branch			1,500
Solfists Creek			1,500
Traverse Valley Creek			1,500
Wickhams Valley Creek			1,500
Zimmers Creek			1,500
Ironwood, Kimble Creek			2,500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
La Crosse, Chipmunk Coulee Creek			510
Coulee Spring Creek			1,500
Sand Lake			1,500
Sand Coulee Creek			1,500
Lancaster Austin Branch			1,500
Borah Branch			1,500
Day Branch			1,500
McPherson Branch			1,500
Raines Branch			1,500
Walker Branch			1,500
Lodi, Millers Creek			255
Long Lake, Coldwater Creek			600
Medford, Yellow River, North Fork			4,500
Menomonie, Anderson Creek			1,500
Asylum Springs Creek			1,500
Ballard Creek			1,500
Big Elk Creek			1,500
Big Hay Creek			1,500
Big Missouri Creek			1,500
Biss Creek			1,500
Boland Creek			3,000
Clacks Creek			1,500
Coon Creek			1,500
Cowan Creek			1,500
Eddy Creek			1,500
Gilbert Creek			1,500
Gilbert Creek, South Branch			1,500
Grutt Creek			1,500
Hay Creek			1,500
Hay River			1,500
Iron Creek			1,500
Irvin Creek			1,500
Knights Creek			1,500
Lambs Creek			1,500
Lambs Creek, South Fork			1,500
Little Elk Creek			1,500
Little Missouri Creek			1,500
Little Otter Creek			1,500
Losby Run			1,500
Louis Creek			1,500
McCarthy Creek			1,500
Mud Creek			1,500
Otter Creek			1,500
Palmers Run			1,500
Palunos Springs Creek			3,500
Pine Creek			1,000
Popple Creek			1,500
Rock Creek			1,500
Rush Creek			1,500
Sand Creek			1,500
Shafer Creek			1,500
Simonson Creek			1,500
Sinking Creek			1,500
Sly Creek			1,500
Smith Creek			1,500
Spring Creek			1,500
Stoner Creek			1,500
Thumb Creek			1,500
Tiffany Creek			1,500
Torgerson Creek			1,500
Trout Creek			1,500
Warners Run			1,500
Wilcox Creek			1,500
Willow Creek			1,500
Wilson Creek			1,500
Wolfs Run			1,500
Merrill, Prairie River			4,500
Staubs Bayou			1,500
Merrillan, Cisna Creek			360
Gearings Creek			360
Halls Creek			1,440
Halls Creek, East Fork			720
Hoyden Creek			360
Sand Creek			360
Stockwell Creek			720
Stroover Creek			360
Van Hersey Creek			360
Vincent Creek			720

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Merrillan, Visneau Creek			360
Visneau Creek, North Branch			360
Millston, Clear Creek			1,500
Fishers Creek			1,500
Glen Creek			1,800
Houser Creek			1,500
Ketchum Creek			1,500
King Creek			1,500
Lambert Creek			3,000
Pigeon Creek			3,600
Pongraty Creek			3,000
Pulling Creek			1,800
Rudd Creek			2,100
Stanton Creek			3,600
Stanton Creek, South Fork			1,500
Wyman Creek			2,100
Zahrte Creek			1,500
Mount Horeb, Elver Branch			510
Sugar River			510
Redgranite, Lawn Creek			875
Rice Lake, Hickey Creek			4,500
Little Fall Creek			3,500
Little Savage Creek			3,500
Little Tuscobia Creek			2,500
Lost Creek			2,500
Pigeon Creek			3,000
Pine Creek			3,500
Rock Creek			4,500
Tuscobia Creek			3,000
Ridgeway, Stephens Creek			1,500
Yaeger Creek			1,500
Spring Valley, Burghardt Creek			1,500
Cady Creek			3,725
Eau Galle River			720
French Creek			3,720
Gilbert Creek			3,000
Lousy Creek			3,360
Mines Creek			1,500
Trout Creek			3,000
Stanley, Swim Creek			3,000
Stevens Point, Little Plover Creek			600
Springville Brook			900
Stitzer, Davis Branch			1,500
Leggett Branch			1,500
Thorp, Bolin Creek			360
Tomah, Ash Creek			3,000
Brandy Creek			6,000
Council Creek			3,000
Flora Creek			250
Little Flora Creek			4,500
Mill Creek			3,000
Mud Creek			3,000
Sand Creek			3,000
Sparta Creek			3,000
Tar Creek			3,000
Tunnel City, Sparta Creek			1,500
Viroqua, Larmo Branch			255
Peterson Branch			255
Waldo, Briggs Creek			900
Onion River, South Branch			900
Wascott, Railton Creek			4,000
Wautoma, Beebe Creek			900
Bird Creek			300
Hoxie Creek			600
Lunch Creek			900
Pine Creek			600
White River			900
Westby, Bad Axe River, North Branch			765
Wheeler, Big Beaver Creek			720
Big Otter Creek			720
King Creek			360
Little Beaver Creek			360
Little Otter Creek			360
Wilton, Beecher Creek			255
Coal Creek			510
Cold Springs Creek			255
Hubbard Creek			510
Slaten Creek			255
Waege Creek			1,755

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Winneboujou, Bois Brule River			18,000
Lake Florence			2,000
Little Brule River			10,000
Nabagamon Creek			4,000
Sand Creek			2,500
Wyoming:			
Beulah, Sand Creek			10,000
Buford, Green River			2,500
Cokeville, Spring Creek			400
Dale Creek, Dale Creek			7,500
Green River, Green River			7,500
Kemmerer, Hams Fork River			2,000
Laramie, Wyoming Fish Commission	50,000		
New Castle, Fawcett Spring Creek			5,000
Sheridan, Hanna Creek			5,000
Sacketts Creek			500
Yellowstone National Park, Willow Creek			20,000
Argentina:			
Argentine Government, Buenos Aires	50,000		
France:			
French Government, Bellefontaine	10,000		
Total[a]	905,000	5,821,322	3,723,489

SUNAPEE TROUT.

New Hampshire:			
Lake Sunapee, Lake Sunapee		229,736	

SCOTCH SEA TROUT.

Maine:			
East Orland, Alamoosook Lake			47

GRAYLING.

Montana:			
Gallatin County, Bridger Creek		100,000	
Lyman Creek		200,000	
Great Falls, Dearborn River			3,000
Madison County, Elk Creek		508,000	
Wolf Creek, Dearborn River			3,000
Washington:			
Seattle, Exposition Aquarium			32
Wyoming:			
Laramie, Wyoming Fish Commission	150,000		
Sheridan, Wyoming Fish Commission	200,000		
Total	350,000	808,000	6,032

PIKE.

Disposition.	Fingerlings, yearlings, and adults.	Disposition.	Fingerlings, yearlings, and adults.
Iowa:		Wisconsin—Continued.	
North McGregor, Mississippi River	13,500	La Crosse, Mississippi River	8,100
Minnesota:		Prairie du Chien, Mississippi River	13,500
Brownsville, Mississippi River	8,600	Total	44,200
Wisconsin:			
Geneva, Mississippi River	500		

[a] Lost in transit, 68,520 fry and 19,964 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS.

Disposition.	Fingerlings, yearlings, and adults.
Alabama:	
Bessemer, West Lake	100
Camp Hill, Tucker's pond	50
Dothan, Floyd's mill pond	100
Mill Pond	100
Estelle, Jones's pond	50
Evergreen, Deming Pond	150
Etheridge Mill Pond	100
Horton Pond	150
Tomlinsons Mill Pond	100
Gadsden, Ewing's pond	60
Goodwater, East Mill Pond	100
Gamble Creek	100
Hatchet Creek	50
Iron City, Polands Pond	25
McKenzie, Wiggin's pond	50
Opelika, Ingrams Mill Pond	200
Smith's pond	100
Prattville, Chambliss Pond	100
Wilkinson's pond	50
Rock Run, Dykes Pond	50
Seale, Ingram's pond	100
Selma, Bayne's pond	50
Childer's ponds	50
Talladega, Groce's pond	50
York, Shelton's pond	100
Arizona:	
Jerome, Goodwin Lake	100
Safford, Artesian Lake	50
Arkansas:	
Adona, Sharp's lake	100
Dollar Junction, Reservoir No. 1	100
Reservoir No. 3	100
Franklin, Boler's lake	100
Lincoln, Ross Spring	100
Magnolia, Pittman's pond	50
Monticello, Williamson's pond	35
Thornton, Freshwater Pond	150
Wilmot, Lake Enterprise	50
California:	
Amandee, California Fish Commission, Honey Lake	90
Bakersfield, California Fish Commission, Kern River	50
Colfax, Lake Vera	150
Fresno, Kings River	100
Lake County, California Fish Commission, Clear Lake	100
Los Angeles, California Fish Commission, Russell Lake	100
Marysville, Feather River	75
Sacramento, California Fish Commission, Brushy Lake	250
California Fish Commission, Pluma Lake	75
Stockton, California Fish Commission, San Joaquin River	100
Connecticut:	
Danbury, Weekapeeka Lake	50
Georgia:	
Ashburn, Lake Wance	300
Atlanta, Wyanokee Pond	50
Buena Vista, Juniper Creek	100
Pineknot Creek	100
Catoosa County, Green Lake	180
Duluth, Smith's pond	125
Jonesboro, Milners Pond	150
Milledgeville, Steinbridge's pond	125
Quitman, McCall's pond	100
Walker County, McFarland's lake	180
Illinois:	
Carbondale, Spillers Lake	50
Thompson Lake	100
Decatur, Sangamon River	2,000
Farmersville, Whites Pool	50
Illinois—Continued.	
Fox Lake, Fox Lake	800
Franklin, Burlington Reservoir	350
Herrin, Squaw Ridge Pond	100
Hillsboro, Seymour Pond	150
Lebanon, Lakehurst Lake	80
Meredosia, Illinois River	23,200
Meredosia Bay	400
Vergennes, Porter's pond	50
Indiana:	
Bedford, Stephenson's lake	100
Boonville, Rudolph's pond	120
Brazil, Sheridan Pond	40
Carbon, Big Raccoon Creek	40
Cloverdale, Netson Spring	40
Crawfordsville, Black Creek	40
Rock River	750
Greencastle, Big Walnut Creek	40
Greenfield, Spring Lake	40
Hillsboro, Coal Creek	40
Lake Cicott, Lake Cicott	80
Mackey, Loehr's pond	30
North Vernon, Hick's pond	75
Paoli, Sugar Grove Pool	75
Richmond, Rettig Lake	80
Thistlewait Lake	40
Iowa:	
Algona, Upper Des Moines River, East Branch	300
Clayton, Mississippi River	20,000
Creston, Summit Lake	250
Glendale, Kyle's pond	300
Manchester, Maquoketa River	4,315
Moulton, Black's pond	100
North McGregor, Mississippi River	22,000
Perlee, Leffler's reservoir	100
Kansas:	
Abilene, Acme Lake	150
Dellvale, Cottonwood Lake	50
Eldorado, Walnut River	150
Garland, Clarkburgh Pond	50
Grenola, Caney Creek	150
Kansas City, Idlewild Lake	75
White Lake	75
Kingman, Evan's pond	75
Reynold's pond	75
Louisburg, Moore's pond	50
Mankato, Chilcott's pond	100
Medicine Lodge, Mary Best Pond	150
Murphy's pond	75
Thomas Lake	75
Wise's pond	75
Muscotah, Deer Valley Lake	100
Rice's pond	100
Newton, Sand Creek	150
Pratt, Waldock Lake	150
Sabetha, Elder Pond	50
Salina, Smoky River	50
Kentucky:	
Bardstown, Cherry's pond	60
Fairground Pond	60
Kelly's lake	60
Samuel's pond	60
Spring Pond	30
Burnside, Cumberland River	200
Covington, Foltz's pond	150
Schlosser's pond	150
Cynthiana, Licking River, South Fork	200
Danville, Hanging Fork Creek	100
Elizabethtown, Gordon Pond	60
Jett Station, Boyette's pond	150
Crutches's pond	150
Simpson's pond	100
Lexington, Elmendorf Lake	60
Lake Ellerslie	200

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Kentucky—Continued.	
Lexington, Quarry Pond	30
Middleboro, Fern Lake	60
Mount Sterling, Gatewood's pond	200
Richwood, Locust Hill Pond	100
Salvisa, Royalty's pond	15
Scottsville, Bradley's pond	100
Sparta, Rosemary Pond	75
Spring Station, Blackburn's pond	100
St. Marys, Little Pond	30
Versailes, Shipp's pond	20
Woodlawn, Clear Pool	30
Louisiana:	
Boleyn, Boleyn Pond	50
Caddo Parish, Union Pond	125
Grand Cane, Magnolia Pond	100
Reisor, Metcalf Mill Pond	125
Romanso's lake	50
Robeline, Sellers Pond	50
Saline, Smith's pond	100
Shreveport, Stringfellow's pond	50
Maryland:	
Cropley, Potomac River	400
Great Falls, Potomac River	960
Highland Station, McCann's pond	125
Michigan:	
Bath, Park Lake	200
Rose Center, Buckhorn Lake	200
Green Lake	200
Minnesota:	
Alexandria, Lake Darling	150
Lake Henry	150
Brownsville, Mississippi River	22,500
Rochester, Zumbro Mill Pond	300
Zumbro River, South Branch	300
St. Paul, Minnesota Fish Commission	4,420
Wheaton, Lake Traverse	100
Mississippi:	
Abbeville, Horse Shoe Lake	1,000
Aberdeen, Crosby's pond	200
Hunting and Fishing Club Lake	400
Batesville, LeMaster's pond	100
Wilson's pond	100
Bay St. Louis, Hellerege's pond	100
Booneville, Oak Grove Lake	300
Brookhaven, McGrath's pond	100
Corinth, Bell Lake	300
Bynum's lake	250
Clear Creek	250
Derryberry Lake	300
Long Pond	300
Powell Pond	300
Sugar Knoll Pond	300
Tuscumbia River	500
Decatur, Russell's mill pond	150
Duck Hill, Clanton Springs	150
Ecru, Lappatubby Creek	300
Edwards, Kidd Lake	200
Heidelberg, McCroney's pond	150
Horn Lake, Johnson's pond	150
Houston, Ford's pond	300
Gogy Lake	300
Wilson's pond	300
Laurel, Lindsey's pond	200
Learned, Osborn's pond	100
Macon, Goose Pond	200
Noxubee Lake	200
Rosa Lake	200
Sallie Spann Lake	200
Silver Lake	200
Thompson's pond	200
Meridian, Fern Pond	400
New Albany, Conner's pond	100
Mississippi—Continued.	
Oxford, Price's lake	400
Pelahatchee, Ross's pond	100
Purvis, Black Creek	500
Sessums, Cedar Home Pond	300
Shuqualak, Dugan's pond	200
Starkville, Johnson's pond	150
Suddurt's pond	300
Thornton, Bee Lake	300
Tupelo, Park Lake	300
Missouri:	
Columbia, University of Missouri	5,837
Deepwater, Dickey's lake	100
Dixon, Strebb's pond	50
Doniphan, French's pond	50
Gilliam, Heinsler's pond	150
Higbee, Higbee Pond	500
Hollister, White River	150
Holmes, Holmes Park Lake	100
Kansas City, Fairmount Park Lake	75
Moselle, Pilliod's pond	50
Mount Vernon, Williams Creek	150
Neosho, Hickory Creek	1,150
Nevada, Lake Park Springs	150
Oak Grove, Webb's lake	50
Rich Hill, McManus's pond	100
Sparta, High Lake	150
Open Valley Pond	125
Springfield, Fountain Spring Lakes	100
Sullivan, Reese's pond	50
Ten Brook, Cedar Crest Lake	200
Warsaw, Turkey Creek	150
Montana:	
Great Falls, Grant's reservoir	200
Nebraska:	
Crawford, Robinson's pond	250
Omaha, Lake Nakomis	1,000
New Jersey:	
Butler, Cold Spring Lake	200
Grenloch, Boody Pond	150
High Bridge, Beghardt Lake	200
New Mexico:	
Carlsbad, Pecos River	75
Roswell, Mexican Lake	225
Rio Hondo	225
Silver Lake	225
Texico, Wooding's pond	75
New York:	
Cambridge, Dead Pond	150
Second Pond	250
Dundee, Waneta Lake	150
Middletown, Talcott Pond	100
Wall Kill River	200
North Carolina:	
Asheboro, Allen's pond	75
Brittain's pond	75
Gluges Pond	75
Henley's pond	75
Corapeake, Lake Jones	150
Mill Pond	150
Hendersonville, Lake Wajaw	75
Leaksville, Matrimony Creek	75
Pelham, Poplar Lake	75
North Dakota:	
Devils Lake, Morrison Lake	250
Hankinson, Lake Elsie	200
Havana, Golden Hill Lake	100
New Salem, Clear Lake	100
St. John, Lake Alexander	150
Ohio:	
Jamestown, Ogan's fish pond	75
Oklahoma:	
Alva, Hyde's pond	75
Ardmore, Caddo Creek	225
Chickasaw Lake	375

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Oklahoma—Continued.	
Ardmore, City Waterworks Lake	225
Coleman's lake	225
Darling's pond	75
Dyer Lake	225
Foster's lake	225
Henry House Creek	150
Hickory Creek	225
Kearney's lake	225
New Lake	225
Rod and Gun Club Lake	150
Shuman's lake	225
Simpson's lake	225
Byars, Chautauqua Lake	225
Coalgate, Sunset Lake	150
Marietta, Blake's lake	75
Leach's pond	225
Rod and Gun Club Lake	225
Smith's pond	75
Muskogee, Illinois River, Barron Fork	300
Okemah, Greenleaf Pond	75
Prague, Ashby's pond	75
Shawnee, Woodland Pond	75
Stonewall, Hona Mere Pond	75
Mirror Lake	75
Oka Okchamali Pond	75
Tishomingo, Pennington Creek	225
Weleetka, Weleetka Reservoir	150
White Oak, Givendale Pond	75
Pennsylvania:	
Ashland, Coney Island Ice Pond	150
Bath, Bushkill Creek	200
Doylestown, Delaware River	200
Neshaminy Creek	200
Tohickon Creek	200
Johnstown, Grosch's pond	125
Mars, Springwater Pond	40
Mohrsville, Irish Creek	150
Reading, Maiden Creek	150
Tulpehocken Creek	450
Sharon, Pymatuning Creek	150
Towanda, Sugar Creek	325
South Carolina:	
Abbeville, Lyons Pond	75
Anderson, Burress's pond	125
Clover, Crowders Creek	125
Mill Creek	125
Easley, Saluda River	150
Johnston, Warren's pond	50
Pomaria, Crims Lake	100
Williams Lake	150
Union, Broad River	125
Wallaceville, Wallace Lake	75
Ware Shoals, Saluda River	250
Yorkville, Crowders Creek	150
Mill Creek	150
South Dakota:	
Presho, Birke's dam	125
Tennessee:	
Adams, Fletcher's pond	150
Craggie Hope, Turnbull Creek	175
Estill Springs, Elk River	250
Hendersonville, Adams Pond	125
Jackson, Crystal Lake	200
Mason, Mitchell's pond	50
Memphis, Coleman's pond	150
Murfreesboro, Beesley's pond	100
Nunnelly, Piney Creek	175
Rogers Springs, Rogers Springs Lake	100
Texas:	
Abbott, Harwell's lake	30
Athens, Fishing Club Lake	50
Koon Kreek Klub Lake	160
Stringer's pond	20

Disposition.	Fingerlings, yearlings, and adults.
Texas—Continued.	
Athens, Walker's pond	40
Austin, Peaceful Valley Lake	30
Bartlett, Hackberry Pond	10
Bennetts, Smoky Run Pond	50
Benjamin, Mitchell's pond	15
Bonham, Garners Pond	20
Penwell's pond	20
Carney, Carney's lake	15
Chandler, Big Eddy Lake	30
Thornburg Lake	30
Coleman, Babington's lake	20
Cameron's pond	10
Corpus Christi, Gray's lake	50
Corsicana, Fish Association Pond	20
Petty's poud	20
Del Rio, Concrete Dam Lake	80
San Felipe Creek	100
San Felipe Creek Pond	50
Detroit, Carpenter's lake	20
Eagle Pass, Bibero Lake	150
Elgin, Brick and Tile Company's pond	20
Moore's lake	20
Garrison, Simpson Mill Pond	25
Springwater Pond	40
Georgetown, Young and Moore's mill pond	50
Giddings, Longley's pond	20
Gilmer, Gunstream Creek	30
Gunstream Mill Pond	30
Goldthwaite, Sante Fe Lake	20
Grandview, Ingle's pond	36
Granger, Lake Burleson	60
Greenbrier, Greenbrier Lake	80
Long's lake	50
Greenville, King's pond	20
Stewart Lake	30
Hillsboro, Hillsboro Lake	134
Honey Grove, Brights Lake	40
Jolley Lake	30
Sherrill Springs Lake	30
Waterworks Lake	60
Houston, Bauss Pond	20
Hutchins, Farmer's Club Lake	60
Kemp, Parker Lake	20
Kerrville, Guadalupe River	60
Lampasas, Alexander Pond	16
Sulphur Creek	36
Leesburg, Clear Pond	40
McKinney, Perkins's pond	20
Malakoff, Snog Lake	30
Marlin, City Lake	78
Miles, Lipan Creek	30
Missouri City, Palmer Lake	40
Monahans, Monahan's pond	10
Morgan, Lowe's pond	40
Mount Pleasant, Country Club Lake	40
Nacogdoches, Mamie Ross Lake	20
Naples, Lake Baxter	20
Odessa, Star Pond	20
Palmer, Love's lake	20
Paris, Crook's lake	30
Gordon Country Club Lake	30
Ownby Lake	30
Park's pool	30
Pecos, Turner's lake	20
Pilot Point, Newton's lake	60
Pritchett, Wilburn's lake	20
Redwater, Mill Pond	40
Richland, Rakestraw Lake	100
Riesel, Tiemann's pond	15
Royse City, Jones's pool	30
Royse Water Company's lake	30

Details of Distribution of Fish and Fish Eggs—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Texas—Continued.	
San Angelo, Kickapoo Creek	33
San Saba River	40
Santa Anna, West's tank	16
Miller's pond	16
Rendleman's lake	16
Seguin, Guadalupe River	60
Sherman, Irving Pond	20
Lyon's lake	40
Sierra Blanca, Friday Pond	50
Skidmore, Arkansas River	100
Strawn, Bluff Lake	50
Gibson's lake	50
McEver's pond	50
Waugh's pond	50
Sulphur Springs, Altom's pond	40
Crabtree's pond	40
Geer's pond	40
Lake Conally	100
Temple, Lake Polk	100
Texarkana, Rose Lake	20
Tulia, Tule Creek	130
Tyler, Bates's pond	20
Saline River	30
Uvalde, Spring Creek	130
Vernon, Cottonwood Pond	60
Doan Pond	50
Hiatt's lake	30
Rowland's pond	30
Sherwood Pond	30
White's pond	30
Waring, Guadalupe River	100
Waxahachie, Simms Lake	200
Weatherford, Clear Lakes	75
Everett's pond	25
Whitesboro, Angling Club Lake	30
Whitesboro Lake	30
Winsboro, Harbin's pond	40
Yoakum, Neimens Lake	100
Virginia:	
Farmville, Stanley Park	100
Holland, Copeland Mill Pond	200
Groseclose, Sinking Springs	125
Lawrenceville, Sherwood Pond	100
McKenny, Rives Pond	100
Midlothian, Atkinson's pond	100
Nottoway, Dunn's pond	100
Fitzgerald Pond	150
Hayden Pond	100
Paeonian Springs, Peacock's pond	375
Petersburg, Drewry's pond	100
Richmond, Hillcrest Lake	150
Patterson's pond	175
South Boston, Jordan's pond	125
Sutherlin, Double Creek Pond	150
Upper Double Creek Pond	150
Williamsburg, Fort Magruder Pond	150
Washington:	
Seattle, Exposition Aquarium	16
West Virginia:	
Hampshire County, Great Cacapon River	960
Inwood, Back Creek	160
Hog Creek	160
Wisconsin:	
Genoa, Mississippi River	5,000
Independence, Bugle Lake	600
La Crosse, Mississippi River	17,500
Minoqua, Lake Kawaquesagon	3,000
Prairie du Chien, Mississippi River	27,000
Wyoming:	
Cheyenne, Lake Minnehaha	750
Clearmont, Brock's reservoir	200
Cody, Beck's pond	250
Hulett, Bush's reservoir	181
Total[a]	217,355

ROCK BASS.

Alabama:	
Anniston, Gibbons's pond	50
Blount Springs, Alldredge's pond	100
Camden, Bonner's pond	100
Courtland, Big Nance Creek	200
Deatsville, Ivey's pond	200
Jackson's pond	200
Dekalb County, Lookout Creek	150
Eufaula, Bush's pond	100
Eutaw, Patton Pond	100
Evergreen, Autrey Pond	150
Noel Pond	150
Savage's pond	100
Gurley, Limestone Pond	200
Iron City, Shoal Creek	200
Montgomery, Browder's pond	100
Mountain Creek, Spring Branch Pond	200
Ozark, Adams's pond	100
Carroll's pond	100
Phil Campbell, Budy Branch	200
Portersville, Horton Spring Pond	75
Prattville, Barnes's pond	125
Taff, Danill Pond	75
Arkansas:	
Imboden, Silver Pond	100
Lewisville, Happy Hollow Lake	100
Arkansas—Continued.	
Magnolia, Eddy Pond	100
Mammoth Spring, Warm Fork Creek	1,700
Ozam, Goodleet's pond	100
Green's pond	100
Robins's pond	100
Georgia:	
Amsterdam, Clara Bell Lake	100
Box Springs, Lake Semokee	250
Bremen, Price's pond	50
Buchanan, Big Creek	100
Covington, Yellow River	200
Dalton, Johnson Creek	125
Mill Creek	400
Eastman, Harper's pond	100
Fairburn, Deep Creek	85
Hogansville, Jones's pond	170
Jeffersonville, Vaughn's pond	300
Madison, Silver Lake	100
Ringgold, Keith Pond	125
Tiger Creek	125
Rockmart, Jenkins Branch	100
Rome, De Soto Lake	100
Grant Lake	100
Teloga, Sitten's pond	75
Tunnel Hill, Catoosa Fishing Club Lake	150

[a] Also 62,500 fry were sent to Des Arc, Ark., for deposit in Des Arc Bayou. Lost in transit, 7,856 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

ROCK BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Illinois:	
Ashley, Randolph's pond	300
Makanda, Wiley's pond	150
Indiana:	
Advance, Whorley's pond	125
Bedford, Stephenson's lake	200
Bloomfield, Jones's pond	100
Crawfordsville, Water Babble Pond	300
Dunkirk, Moore's lake	125
Greencastle, Woodland Lake	125
Kimmel, Beers's lake	100
La Fontaine, Locust Grove Pond	100
Marion, Baldwin's pond	75
Pierceton, Barber Lake	100
Richmond, Thistlewaite Lake	150
Saratoga, Warren Pond	125
Vincennes, Maple Lawn Lake	100
Iowa:	
Dexter, Kauffmann's pond	125
Meadow Pond	150
Tuskeega, Dunham's pond	125
Kansas:	
Great Bend, Gallon's pond	150
Lake City, Quiet Pool	150
Willow Pond	200
Lenora, Feuer's pond	200
Marion, Lyons Pond	100
Medicine Lodge, Third Pond	150
Natoma, Hellwege Pond	150
Pauline, Johnson's pond	150
Sharon, Sharon Valley Lake	300
Wakeeney, McCollum's pond	150
Kentucky:	
Allensville, Chestnut's pond	125
Mallory's pond	125
Riley's pond	125
Auburn, Clark's pond	100
Beaver Dam, Stevens's pond	125
Bowling Green, Blue Pond	125
Cave City, Baird's pond	125
Davis's pond	100
Dennison's pond	100
Field Pond	125
East View, Richardson's pond	150
Finchville, Duvall's pond	225
Glasgow, Royalty Lake	350
Hickman, Dodds's pond	150
Hodgesville, Quinn's Bayou	125
Mount Sterling, Limestone Lake	125
Munfordville, Moppin Pond	125
Paris, Arnold's pond	125
Pewee Valley, Mint Lake	125
Scottsville, Bradley's pond	125
Somerset, Stephens and Lynch's pond	125
Stanford, Reid's pond	125
Waddy, Waddy's pond	125
Maryland:	
Baltimore, Hill Lake	100
Cockeysville, Jesseps Pond	100
Great Falls, Potomac River	2,525
Mount Airy, Browningsville Pond	200
Massachusetts:	
East Bridgewater, Robbins Pond	75
Minnesota:	
Brownsville, Mississippi River	750
LeRoy, Upper Iowa River	250
Mississippi:	
Bassfield, Blount Spring Branch	200
Bolton, Bradley Pond	100
Brownsville Pond	100
Double Pond	100
Horton Pond	100
McConnell Pond	100
Bovina, Cook's pond	150
Muddy Creek	150

Disposition.	Fingerlings, yearlings, and adults.
Mississippi—Continued.	
Brock Haven, Laird's pond	100
Centerville, Dickson Pond	250
Columbus, Weaver's lake	100
Corinth, Berry's lake	100
Crystal Springs, Ashley's pond	100
Dancy, Fortner's pond	100
Duck Hill, Moore's pond	100
Eupora, Forest Pond	100
Gloster, Ladens Pond	100
Spring Pond	200
Grenada, Mill Pond	100
Jackson, Green's pond	100
Laurel, Lily Pond	150
Macon, Anderson's pond	100
Scales's pond	100
Magnolia, Big Tangipahoe Creek	100
Meridian, Mineral Pond	100
Mineral Well, Bullington's lake	150
New Albany, Pine Dale Pond	100
Quitman, Shotts's pond	100
Missouri:	
Cabool, Glenwood Fisheries Pond	600
Carrollton, Rea Pond	125
Independence, Spring Pond	150
Lockwood Frisco Lake	200
Newberg, Little Piney Creek	1,350
Piedmont, Henson's pond	150
Springfield, Fountain Spring Lake	150
Warrensburg, Meily's pond	150
New Jersey:	
Boundbrook, Radel's pond	100
New Mexico:	
Delphos, Delphos Pond	100
Deming, Excelsior Pond	200
Roswell, Aftonwater Pond	500
Lake Clear	300
Texico, Dunn's pond	100
Wooding's lake	100
New York:	
Long Island City, Jagerman's pond	100
North Carolina:	
Chadbourn, Wallace's pond	150
Star, McMillan's pond	150
Statesville, Yadkin Valley Pond	200
Waxhaw, Norwood Branch	150
Ohio:	
Cincinnati, Luray Averne Lake	100
Hudson, Mud Brook Pond	100
Mansfield, Park Lake	100
Wickliffe, Grant Creek	100
Oklahoma:	
Milburn, Slaughter and Harris's pond	150
Texahoma, McCollum's pond	100
Pennsylvania:	
Bath, Bushkill Creek Ponds	150
Brookville, Blood Run Pond	100
Bruin, Bear Creek	100
Enon Valley, Little Beaver Creek	150
New Bethlehem, Leatherwood Creek	100
Pittsburg, Artzberger's pond	100
South Carolina:	
Cowpens, Dorman's pond	100
Fairfax, Lightsey's pond	100
Greenwood, Barksdale's pond	225
Cobb's pond	125
Curl Tail Creek Pond	125
Sproles's pond	125
Westminster, Chenuga Creek	100
South Dakota:	
Orient, McDermid's pond	200
Pierre, Spring Creek	200
Tennessee:	
Ashland City, Marrowbone Creek	250
Big Sandy, Dowdy's pond	125

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

ROCK BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Tennessee—Continued.	
Clarksville, Merritt Ponds	150
Coal Creek, Lovely's lake	100
Donelson, Whitworth Pond	200
Gallatin, Baber's pond	150
Hohenwald, Fite's pond	150
Johnson City, Swingle's pond	125
Lawrenceburg, Shoal Creek	300
Luttrell, Hamilton Lake	250
McMinnville, Collins River	250
Middleburg, Wood's pond	100
Netherland, Hammock Spring Pond	100
Orlinda, Meguiar's pond	150
Stringer's pond	150
Texas:	
Alpine, Cawthon's pond	50
Pruett's pond	100
Avery, Braden's Spring Pond	15
Blossom, Oil Company Pond	85
Bovina, Rheas Pond	30
Brownwood, Adam Branch	100
Sigman's lake	50
Yantis Pond	50
Bullard, Walker's pond	50
Caddo Mills, Head's pond	50
Carney, Casey's pond	80
Lagrone's lake	80
Caldwell, Little's pond	30
Catspring, Cornelius's pond	100
Sens's pond	100
Center, Lily May Lake	100
Cheetham, Carroll's pond	100
Clarendon, Morgan's pond	100
Corsicana, Corsicana Fish Association Pond	60
Courtney, Weaver's pond	30
Dallas, Dealy Park Pond	75
Obenchain's pond	75
White Rock Rod and Gun Club Lake	300
Denton, Anderson's pond	50
Detroit, Christian's pond	50
Tomlinson's pond	50
Driftwood, Onion Creek	200
Elgin, Welander's pond	50
Emory, Sandy Pond	75
Falfurrias, Caldwell's pond	100
La Esperanza Pond	50
Sloan's pond	50
Floresville, Zarl's pond	50
Giddings, Albrecht's pond	50
Gilmer, Blalack's lake	30
Hallettsville, Spring Pond	50
Hewitt, Keeble's pond	100
Honey Grove, Broadfoot Lake	50
Hutchins, Farmers' Club Lake	100
Jacksonville, Ragsdale Lake	100
Jewett, Byrns Lake	50
Judkins, Metz Pond	30
Kaufman, Blunkenship's pond	20
Kemp, Collin's pond	20
Kosse, Vickery's pond	100
La Grange, Gilbert Pond	50
Lampasas, Hills Pond	120
Laredo, Bulls Eye Lake	150
Lone Oak, Simmons's pond	75
Lott, Bailey's pond	75
Liles's pond	125
Lytle, Robinson's pond	50
Malakoff, Fish and Game Club Lake	100
Rushing Lake	100
Marfa, Poole's pond	50
Prospect Hill Pond	50

Disposition.	Fingerlings, yearlings, and adults.
Texas—Continued.	
Midland, Childers's pond	50
Folk's pond	50
Holmes's pond	50
Malone's pond	50
Morse's pond	50
Scarborough's pond	50
Warren's pond	30
Nordheim, Park Pond	50
Normance, Blackburn's pond	50
Odessa, Hilburne's pond	40
Martin's pond	70
North Pond	20
Pan Handle, Hoffman's pond	20
Paris, Bass Lake	50
Holland's pond	50
Irving Lake	75
Perry, Smith's pond	30
Reisel, Kuhl's pond	60
Rosebud, Jefferson Pond	75
Rusk, Dickinson's pond	60
Sagerton, Wenderborn's pond	40
San Angelo, Kickapoo Creek	25
San Saba River	25
Sierra Blanca, Friday Pond	150
Somerville, Campbell's lake	100
Sunset, Kierce's pond	50
Taylor, Lundell Springs	50
Swenson's pond	75
Terrell, Bennett's pond	100
Texarkana, Boston Road Water Works Lake	25
Ghio Spring Lake	25
Thornton, McClelland's pond	30
Thurber Junction, Thurber Lake	200
Toyah, Rustler Springs	60
Uvalde, Benson's pond	40
Brigman's pond	50
Valentine, Evans's pond	50
La Luna Pond	75
West Point, Mount Kebo Lake	75
Wichita Falls, Silver Lake	150
Wills Point, McDonald's pond	50
Yorktown, Redondo Pond	50
Utah:	
Lund, Gifford Spring Pond	150
Virginia:	
Barcroft, Lake Sherbrook	50
Bracey, Spring Pond	100
Charlottesville, City Reservoir	300
Springdale Pond	100
Cohoke, Cohoke Pond	200
Crozet, Miller School Pond	100
Danville, Riverside Lake	300
Fredericksburg, Rutledge Pond	100
Spring Pond	100
Hanover, Cady Pond	300
Etna Mills Pond	100
Lynchburg, Dreaming Creek	300
Nathalie, Catawba Creek	100
Rosedale Pond	100
North Garden, Guthrie Hall Lake	100
Richmond, Hillcrest Lake	250
Rockfish, Harris Pond	100
Ruther Glen, Mataponi Pond	125
Salem, Graham's pond	150
Horner's pond	150
Scottsville, Bragg's pond	100
Somerset, Bloomfield Pond	200
Sweet Hall, Custis Mill Pond	300
Lee Pond	200
Tunstalls, Garlicks Mill Pond	225
Richardson's pond	200

Details of Distribution of Fish and Fish Eggs—Continued.

ROCK BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Virginia—Continued.	
Wytheville, Nye's pond	100
Reed Creek	500
Tates Run	3,800
Washington:	
Seattle, Exposition Aquarium	20
West Virginia:	
Reader, Haught's pond	82
Wellsburg, Cross Creek	500
Wisconsin:	
Gordon, Blue Gill Lake	300
Clear Lake	300
Wagner Lake	300
La Crosse, Mississippi River	750
Wyoming:	
Sheridan, Lake De Smet	300
Total[a]	51,112

WARMOUTH BASS.

Disposition.	Fingerlings, yearlings, and adults.
Georgia:	
Lake Park, Francis Lake	100
Warm Springs, Cold Springs Creek	1,628
Maryland:	
Great Falls, Potomac River	550
Total	2,278

SMALL-MOUTH BLACK BASS.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Alabama:		
Bessemer, Woodward Pond	.....	400
Guntersville, Short Creek	.....	400
Arkansas:		
Gilbert, Buffalo Fork of White River	.....	1,250
Mammoth Spring, Spring River	.....	12,100
Newport, Bergen Lake	.....	1,250
Pilot, Myatt River	.....	500
Ravenden Springs, Jane Creek	.....	600
Rottaken, Big Lake	.....	2,500
Duncan Lake	.....	900
Fourche Bayou	.....	900
Kuykendall Lake	.....	900
Old River Lake	.....	2,500
Salem, Spring River, South Fork	.....	5,500
Connecticut:		
East Hampton, Pocatopaug Lake	2,000	.....
Georgia:		
Box Springs, Lake Mohignac	.....	100
Indiana:		
Angola, Falings Lake	.....	500
Fox Lake	.....	500
Loon Lake	.....	500
Round Lake	.....	500
Bloomfield, Doans Creek	.....	200
Plummer Creek	.....	200
Indianapolis, Eagle Creek	.....	600
Middlebury, Hunts Lake	.....	200
Iowa:		
Chester, Iowa River	.....	500
Kentucky:		
Bowling Green, Drake Creek	.....	3,000
Gasper River	.....	3,000
Crab Orchard, Dicks River	6,000	.....
Danville, Water Works Pond	6,000	.....
Glasgow, Beaver Creek	.....	700
Rowland, Dicks River	6,000	.....
Winchester, Crutcher's pool	2,000	.....
Maine:		
Belgrade, Great Pond	1,900	.....
Danville Junction, Tupps Pond	1,900	.....
Maryland:		
Great Falls, Potomac River	.....	3,009
Greensboro, Silver Spring Pond	.....	150
Laurel Brook, Little Gunpowder Falls River	.....	200
Massachusetts:		
Fitchburg, Meetinghouse Pond	2,000	.....
Ward Pond	2,000	.....
Hamilton, Ipswich River	1,000	.....
Waltham, Hardy Pond	1,000	.....
Michigan:		
Brooklyn, Vineyard Lake	.....	500
Central Lake, Intermediate Lake	.....	500
Charlevoix, Twenty-six Lake	.....	500
Clarion, Walloon Lake	.....	500
Clarks Lake, Clark Lake	.....	500
Clarkston, Mud Lake	.....	500
Devils Lake, Devils Lake	.....	500
Edwardsburg, Christiana Creek	.....	500
Houtz Lake	.....	500
Hanover, Mud Lake	.....	500
Round Lake	.....	1,000
Rushtine Lake	.....	500
Hinchman, St. Joseph River	.....	500
Howell, Thompson Lake	.....	500
Indian River, Burts Lake	.....	500
Ironwood, Independence Lake	.....	150
Long Lake	.....	150
Sans Souci Lake	.....	300
Silver Lake	.....	200
Sunday Lake	.....	150
Taylor Lake	.....	150
Jackson, Clarks Lake	.....	1,000
Wolf Lake	.....	500
Laingsburg, Round Lake	.....	500
Lakeland, Rush Lake	.....	500
Weller Lake	.....	500

[a] Lost in transit, 6,032 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SMALL-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.		
Lake Ann, Bellas Lake		500
Lake Ann		500
Pearl Lake		500
Lupton, Townline Lake		390
Manitou Beach, Devils Lake		900
Round Lake		400
Mayfield, Crooked Lake		500
Oden, Crooked Lake		500
Orchard Lake, Pine Lake		500
Owosso, Shiawassee River		500
Penn, Birch Lake		500
Pentecost, Sand Lake		700
Saline, Arnolds Lake		500
Shepardsville, Maple River		500
South Haven, Black River		500
Whitmore Lake, Whitmore Lake		1,000
Ypsilanti, Frains Lake		500
Murray Lake		500
Mississippi:		
Corinth, Smalls lake		600
Tuscumbia River		600
New Albany, Rainey Lake		600
Missouri:		
Branson, White River		1,800
Galena, James River		1,800
Grandview, Lake Claire		300
Martin City, Walnut Lake		750
Mount Vernon, Williams Creek		900
New Hampshire:		
Keene, Spofford Lake	2,000	
Littleton, Partridge Lake	15,000	
Meredith, Lake Waukawan	2,000	
Penacook, Long Pond	1,800	
Potter Place, Little Sunapee Lake	1,800	
New Jersey:		
Alloway, Hitchner Pond		400
Blairstown, Sucker Pond		225
Boonton, Koehler's lake		200
Clayton, Moore Lake		200
Dover, Piccatinny Lake		200
Frenchtown, Delaware River		200
Princeton, Carnegie Lake		404
Sewell, Sunset Lake		250
Vineland, Maurice River		200
New York:		
Altamont, Thompson Lake	6,000	250
Batavia, Godfrey Pond		71
Tonawanda Creek		71
Cambridge, Crystal Lake		1,200
Lake Lauderdale		950
Central Bridge, Schoharie River	6,000	375
Cold Spring, Glen Ivy Lake		200
Congers, Rockland Lake		400
Cuba, Cuba Lake		250
Eagle Bridge, Lake Lauderdale	4,200	
Schoolhouse Pond	4,200	
Elmira, Chemung River		250
Fonda, Caroga Lake		250
Fort Edward, Glen Lake	6,000	
Trout Lake	6,000	
Glens Falls, Glen Lake		300
Kington, Esopus Creek		200
Rondout River		200
La Grange, Clove Spring Pond		150
Middletown, Wall Kill River		200
Millerton, Indian Pond		200
New Paltz, Snoopkill Brook		150
Oneonta, Susquehanna River	6,000	
Sharon Springs, Argusville Pond		250
Walden, Wall Kill River	8,400	
New York—Continued.		
West Point, Brooks pond	8,500	
North Carolina:		
Morganton, Catawba River		250
Johns River		250
Linville River		250
South Fork Creek		500
Wilsons Creek		250
Ohio:		
Canton, Nimishillen Creek		500
Gambier, Kokossing River		200
Mansfield, Mohican River		500
Masillon, Claypool Pond		500
Youngstown, Lake Cohasset		500
Lake Hamilton		500
Oklahoma:		
Ardmore, Cool Creek		300
Henry House Creek		300
Hickory Creek		300
Little Hickory Creek		300
Rutherford Lake		300
Tully Creek		300
Marietta, Rod and Gun Lake		300
Pennsylvania:		
Bedford, Dunning Creek		200
Carbondale, Brownell Dam		200
Crystal Lake		200
Elwood City, Muddy Creek		200
Greenville, Shenango River		74
Huntingdon, Raystown Branch		200
Johnstown, Hinkston Run		150
Lebanon, Ebenezer Lake		300
Laudermilch Dam		150
Mishes Dam		150
Quittabahilla Creek		150
Raccoon Creek		150
Stavers Dam		150
Stracks Lake		350
Water House Lake		150
Weidmans Pond		150
Woomers Pond		150
Lenape, Brandywine Creek		200
Lewisburg, Buffalo Creek		200
Penn Creek		200
Manns Choice, Raystown Branch		400
Oil City, Alleghany River		71
Patton, Chess Creek		170
Rockwood, Alleghany River		71
Rowland, Roberts Lake		200
Shirley, Aughwick Creek		200
Susquehanna, Comforts Pond		250
Susquehanna River		250
Walters Lake		250
Thompsons, Alleghany River		71
Towanda, Towanda Creek		200
Venango, Gravel Run		71
Wallingford, Ridley Creek		125
West Chester, Brandywine Creek		200
Rhode Island:		
Kingston, Barber Pond	15,000	
South Carolina:		
Gaffney, Cherokee Creek		160
Tennessee:		
Athens, Rogers Creek		800
Denver, Trace Creek		2,500
McEwen, Hurricane Creek		3,000
Mitchellville, Drakes Creek		300
Portland, Elm Sink Pond		4,000
Riceville, Spring Creek		400
Springfield, Red River		2,000

Details of Distribution of Fish and Fish Eggs—Continued.

SMALL-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Vermont:		
Rutland, Otter Creek	8,000	
Rutland County, Lake St. Catherine	8,000	
St. Johnsbury, Joe's pond	40,000	
Nichols Pond	15,000	
Passumpsic River	21,474	
Virginia:		
Ashby, Shenandoah River		300
Cedar Bluff, Clinch River	3,000	
Max Meadows, Reed Creek	2,500	
Wallace, Beaver Creek	1,000	
Wythe County, Reed Creek		120
Washington:		
Seattle, Exposition Aquarium		21
West Virginia:		
Harpers Ferry, Potomac River		1,000
Romney, Potomac River, South Branch	12,000	
Springfield, Potomac River, South Branch	12,000	
West Virginia—Continued.		
Wellsburg, Buffalo Creek	15,000	
White Sulphur Springs, Greenbrier River		115
Wisconsin:		
Arbor Vitae, Trout Lake		800
Birchwood, Bennett Lake		200
Duck Lake		200
Nice Lake		200
Pickerel Lake		200
Raspberry Lake		200
Squaw Lake		200
Vinnedge Lake		200
Dunbar, Coleman Lake		200
Moon Lake		200
Elcho, Enterprise Lake		200
Otter Lake		200
Iron County, Bear Lake		150
Moose Lake		150
Iron River, Pike Lake		310
Total [a]	262,674	111,924

LARGE-MOUTH BLACK BASS.

Alabama:		
Albertville, High's pond		60
Aliceville, Gardner's lake		100
Going's Mill Creek		100
Andalusia, Hart's mill pond		60
Anniston, Lakewood Lake		25
Ohatchee Creek		25
Savage Lake		25
Banks, Law's pond		90
Walnut Creek Pond		2,000
Bell Factory, Flint River		250
Belle Mina, Blackwell Springs		325
Fogg Spring		150
Piney Creek		300
Brierfield, Little Cahaba River		2,000
Booth, White Water Mill Pond		1,000
Burnsville, Spring Pond		1,000
Butler, War Lock Creek		75
Calera, O'Neal's pond		1,000
Camp Hill, Jarrell's pond		60
Cedar Bluff, Locust Branch		50
Centerville, Light Company Pond		1,500
Spring Creek		1,500
Chunchula, Sweetwater Creek		2,000
Columbia, Omussee Creek		2,000
Collinsville, Big Wills Creek		2,500
Courtland, Big Nance Creek		200
Crews, Beaver Creek		300
Cuba, Sheffield's pond		125
Cullman, Little River		125
Curls Station, Curls Pond		125
Decatur, Beaver Lake		90
DeKalb County, Town Creek		50
Demopolis, Webb's pond		125
Elrod, Sipsy River		200
Enterprise, Wilkerson Creek		90
Eutaw, Trussells Creek		50
Warrior River		325
Evergreen, Hunter Hill Pond		1,000
Fayette, Bankhead's pond		700
Musgrove Pond		200
Fernbank, Spring Branch		25
Five Points, Poplar springs Pond		60
Alabama—Continued.		
Florence, Cypress Creek		425
Franklin County, Hodges Reservoir		550
Geneva, mill pond		1,000
Georgiana, L. and N. Reservoir		3,000
Glen Allen, New River		200
Goodwater, Crews Eddy		2,000
Electric Pond		1,000
McEwen Pond		2,000
Greenville, Butler Springs Creek		60
Guntersville, St. John's pond		60
Haleysville, Allen Creek		150
Freestone Pond		60
Gordon's pond		125
Miller Pond		60
Hartford, Burch Pond		2,000
Collins Pond		2,000
Dillard Mill Pond		1,200
Hinson Mill Pond		1,000
Hurricane Mill Pond		2,000
Justice's pond		1,000
Hartsells, Flint Creek		200
Hollywood, Hurt's pond		125
Huntsville, Esslinger's spring		100
Indian Creek		125
Lee Pond		125
Merrimack Lake		150
Thompson Lake		125
Ivy, Gillespie Pond		75
Jasper, Blackwater Creek		450
Jeff Station, Limestone Creek		150
Knoxville, Spencer's pond		125
La Fayette, Allen's pond		1,000
Letohatchie, Horseshoe Lake		1,000
Livingston, Hawkins's pond		125
Horn's pond		25
Lealand Pond		125
Millport, Coal Fire Creek		200
Lookapallila Creek		125
Mobile, Lake Huriosco		1,000
Monroe, Limestone Creek		2,000
Montevallo, Shoal Creek		1,000
Spring Creek		1,000
Odenville, Mountain Lake		500

[a] Lost in transit, 2,666 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Alabama—Continued.		
Opelika, Chewacla Creek		60
Sasser's pond		1,000
Peterman, Brushy Creek		2,000
Phoenix, Poplar Spring Pond		1,000
Pink, Champion's pond		1,000
Reform, Coal Fire Creek		400
Richardson's pond		150
Roanoke, Mann's pond		1,000
Waller's mill pond		2,000
Weoka Creek		60
Seale, Bush's pond		60
Slocomb, Dean Mill Pond		1,200
Springville, Timber Branch		60
Spruce Pine, Little Bear Creek		200
Smith's pond		125
Spring Pond		125
Sulligent, Yellow Creek		350
Sycamore, Sycamore Creek		1,000
Talladega, Chehawhaw Creek		2,000
Taylor, Bromton's pond		1,000
Town Creek, Town Creek		200
Tuscaloosa, Black Warrior River		100
Union Springs, Clear Water Pond		60
Walker's pond		60
Whitney, Beaver Creek Mill		90
Winfield, White Hill Pond		100
Arizona:		
Flagstaff, Lake Mary		300
Fort Thomas, Goodwin Reservoir		200
Jerome, Peck Lake		200
McLellan, McLellan Lake		200
Safford, Andrews's reservoir		100
Arkansas:		
Arkadelphia, Caddo Creek		1,275
Ouachita River		400
Batesville, Polk Bayou		56
Bellefonte, Byrom's lake		50
Bradley, McGee Pond		200
Brentwood, White River, West Fork		25
Camden, Greening Pond		700
Johnson Lake		25
Ouachita River		2,000
Conway, Adams Lake		450
Cotter, Big Creek		25
Elba, Red River, North Fork		1,000
Eudora, Boueff River		750
Hope, Spring Lake		225
Hot Springs, Mountain Spring Pond		200
Kingsland, Gates's pond		25
La Grange, Lake Fannie		900
Lake Village, Lake Chicot		2,250
Little Rock, Partee Lake		600
McAlmont, Fairmon's lake		600
McNeil, Black Branch Pond		300
Mena, Board Camp Creek		25
Iron Fork Creek		25
Little Missouri River		50
Mount Fork River		50
Ouachita River		50
Powel Creek		25
Rock Creek		25
Twomile Creek		25
Nashville, Coleman's pond		200
Mine Creek		400
Ozan, Barrow's pond		25
Conway's pond		25
Robins's pond		50
Pine Bluff, Brockway's lake		200
Lake Jefferson		900
Pitts Lake		400
Prescott, Blakely's pond		300
Grassy Lake		300
Arkansas—Continued.		
Scotts, Old River		1,100
Turrell, Lake Moonshine		600
Upland, Walker Creek		450
Walco, Walco Pond		25
Warren, Gannaway's pond		750
Womble, Caddo Creek		600
Yelville, Crooked Creek		750
Colorado:		
Boulder, Pinehurst Lake		100
Denver, Spring Valley Lake		100
Eastonville, Neff Gulch Pond		100
Kiowa County, King Lake		200
Nee Gronda Lake		200
Nee No She Lake		200
Nee Sopha Lake		200
Queen Lake		200
Loveland, Boyd Lake		200
Seven Lakes Reservoir		250
Connecticut:		
Cos Cob, Brambleton Pond		100
East Hampton, Pocotapang Lake		300
Jewett City, Aspinook Reservoir		300
Norwalk, Fourteenacre Pond		200
Nash Mill Pond		200
Norwalk Reservoir		300
Slit Mill Pond		250
South Kent, Hatch Pond		100
Waterbury, Maple Hill Pond		150
West Cornwall, Cream Hill Lake		100
Delaware:		
Harrington, Luff Mill Pond		70
Smith Mill Pond		70
Hockessin, Burgess Pit		70
Middletown, Silver Lake		70
Milford, Haven Lake		70
Millsboro, Indian River		70
Milton, Paynters Mill Pond		70
Saw Mill Pond		65
Townsend, Harman's mill pond		70
Wilmington, St. Martins River		280
Florida:		
Altamonte Springs, Lake Adelaide		1,000
Lake Orienta		3,000
Brandon, Knox Pond		1,000
Chipley, Blue Pond		200
Clermont, Crescent Lake		725
Fort Meade, Langford's lake		1,000
Gadsden County, Shaw Farm Pond		1,000
Lakeland, Lake Hollingsworth		3,000
Lake Morton		1,000
Lake Parker		4,000
Taylorsville, Davids Lake		2,000
Georgia:		
Albany, Kinchatoonee Creek		2,000
Ambrose, Big Fork Creek		1,500
Spring Lake		1,500
Ashburn, Rockhouse Pond		1,000
Atlanta, Durham's pond		1,000
East Lake		2,000
Lake Como		300
Spring Branch Pond		2,000
Augusta, Carmichael Club Pond		200
Game Preserve Club Pond		250
Lankey Pond		200
Ayersville, Demon Creek		30

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Georgia—Continued.		
Baxley, Tippins Pond		100
Berzelia, McCormick Pond		125
Brownwood, Kinchatoonee Creek		100
Brookfield, Stokes Fish Pond		500
Buchanan, Bentley Branch		25
Big Creek		25
Little Creek		25
Cairo, Dallar Creek		2,000
Catoosa County, Green Lake		50
Spring Creek		1,000
Spring Lake		1,000
Cedartown, Big Bear Creek		50
Big Spring Branch		25
Cedar Creek		100
Lyons Pond		25
Peeks Lake		25
Philpot Spring		25
Reeds Branch		25
Rudiceal Lake		25
Silver Creek		25
Clarksville, Glade Creek		1,000
Clayton, Chechero Creek		32
Hiawassee River		1,000
Collins, Ohoopee River		250
Columbus Foley's lake		100
Commerce, Bluestone Creek		25
Oconee River		1,300
Covington, Yellow River		4,000
Cuthbert, Old Gum Pond		100
Sealy's pond		100
Dalton, East Lake		125
Dawson, Chichesawhachee River		475
Ichwaynochaway River		475
Devereux, Mill Pond		125
Douglas, Baker's pond		600
Beaver Pond		100
Elberton, Broad River		1,500
Fairburn, Alma Lake		50
Faver Pond		2,000
Gainesville, Chattahoochee River		1,600
Greensboro, Beaver Dam Creek		800
Bethea Pond		25
Brown's pond		25
Champion's pond		1,000
Davison's pond		25
Griffin, Towaliga River		250
Hagan, Smith Mill Pond		150
Junction City, Clear Spring Pond		100
Kingston, Two Run Creek		125
Lake Park, Clayton Lake		1,000
Ocean Pond		2,000
Pike Pond		2,000
Lithonia, Whitley's pond		1,000
Lulu, Tesnatee Creek		30
McDonough, Lemmons Pond		300
Madison, Poplar Hill Farm Lake		25
Shady Brook Pond		1,000
Marietta, Juanita Lake		100
Rottenwood Creek		125
Marshallville, Big Indian Creek		1,000
Pitts Branch		1,000
Middleton, Savannah River		30
Millen, Buckhead Creek		425
Monroe, Lake Viney		25
Sandy Creek Mill Pond		25
Morgan Falls, Chattahoochee River		2,000
Norwood, Drake Pond		25
Ochlochnee, Ochlochnee Pond		100
Oglesby, Bryan's pond		25
Paschal, Railroad Lakes		100
Passover, Johnson's pond		500
Raccoon, Moor Creek		25
Raccoon Creek		25
Rome, Tehune's pond		25
Sandersville, Knight's pond		150
Scarboro, Ogeechee River		1,000
Senoia, White Water Creek Pond		2,000
Sparta, Harris's mill pond		150
Summerville, Branch Pond		25
Selmor Spring Pond		25
Sycamore, Branch Pond		150
Coarsey's pond		125
Spring Water Pond		150
Talking Rock, Talking Rock Creek		75
Thomson, Smith Mill Pond		3,000
Toccoa, Little Toccoa Creek		120
Tunnel Hill, Catoosa Fishing Club Lake		275
McCollom's lake		150
Valdosta, Loch Laurel Lake		2,000
Walker County, Chickamauga Lake		50
Crawfish Springs Lake		1,125
Warrenton, Beachtree Branch		100
English Pond		125
Gin Branch		100
Lakes Pond		125
Washington, Little River Mill Pond		75
Waynesboro, Buxton Mill Pond		150
Hatchers Mill Pond		125
Willacoochee, Roberts Gin Pond		2,000
Winchester, Felton Mill Pond		100
Winder, Beech Creek		1,000
Wrens, Russell Mill Pond		150
Idaho:		
Nampa, Lake Ethel		200
Illinois:		
Alpha, Crescent Lake		175
Antioch, Lake Marie		375
Aurora, Fox River		350
Buncombe, Keller's mill pond		12
Burksville, Muskrat Pond		24
Carbondale, Thompson Lake		24
Carterville, Hampton's pond		24
Cherry Point, Schance's ponds		35
Collinsville, Doukville Pond		100
Dallas City, Mississippi River		200
Franklin, Burlington Reservoir		180
Freeport, Pecatonica River		350
Godfrey, Old Sport's Retreat Pond		36
Golconda, Walkers Lake		36
Grays Lake, Gage Lake		375
Henderson County, Lone Tree Lake		200
Hillsboro, Challacombe's lake		60
Seymour Pond		60
Jacksonville, Fish Creek		240
Kensington, Lake Calumet		525
Kirkville, West Okaw River		70
Lake Villa, Cedar Lake		375
Lebanon, Lakehurst Lake		48
Markham, Riley's pond		60
Meredosia, Illinois River		444

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Illinois—Continued.		
Momence, Kankakee River		525
Paris, Reservoir Lake		35
Shelbyville, Kaskaskia River		80
Sparta, Crothers Lake		84
Sterling, Rock River		100
Thornton, Thornton Lake		100
Vienna, Dutchman Creek		36
Whittenberg's pond		36
Waukegan, Druce Lake		350
Indiana:		
Albion, Kuhn Lake		75
Little Lake		125
Long Lake		125
Miller Lake		125
Silver Lake		125
Weeks Lake		75
Angola, Howard Lake		75
Attica, Coal Creek		35
Aurora, North and South Hogan Creeks		25
Bluffton, Buck's pond		50
Boonville, Baker's lake		45
Bourbon, Fribley's lake		75
Cambridge City, Martindale Creek		70
Chesterton, Morgan's lake		125
Crawfordsville, Little Creek		44
Lye Creek		43
Middle Water Babble Pond		70
North Walnut Creek		44
Rock River		44
Crown Point, Fancher Lake		75
Culver, Lake Maxinkuckee		625
Darlington, Sugar Creek		35
Delphi, Deer Creek		35
English, Little Blue River		45
Evansville, Okeefinokee Pond		45
Hamilton, Hamilton Lake		150
Indianapolis, Fall Creek		70
White River		70
Jasper, Calumet Lake		45
Kimmel, Baugher Lake		125
Metz Lake		75
Kokomo, Wild Cat Creek		50
Lawrenceburg, Tanner Creek		75
Liberty, Whitewater River		70
Madison, Brindley's pond		25
Metamora, Brookville and Metamora Canal		25
Monterey, Graves Lake		150
Odon, Odon Lake		35
Orleans, Daisy Pond		35
McCoy's pond		35
Pickens Pond		35
Owensburg, Indian Creek		48
Porter, Calumet River		125
Round Lake		125
Redkey, Mississinewa River		50
Rushville, Flatrock River		70
Seymour, Peters Lake		25
Shelbyville, Big Blue River		40
Little Blue River		35
Spades, Huber's pond		25
Stewartsville, Footes Lake		45
Tipton, Fouch's pond		35
Veedersburg, Coal Creek		70
West Lebanon, Rock Creek		35
Williamsport, Wabash River		70
Iowa:		
Algona, Des Moines River, East Fork		300
Brighton, Skunk River		75
Chester, Upper Iowa River		300
Clear Lake, Clear Lake		500
Coggon, Buffalo Creek		450
Corning, Silver Lake		50
Creston, Summit Lake		175
Elkader, Turkey River		3,500
Fairfield, Wilson Pond		50
Miller's pond		50
Fort Madison, Green Bay Lake		1,000
Graettinger, Clear Lake		200
Harlan, White's pond		200
Knoxville, Des Moines River		75
Lamoni, Rhodes Pond		50
Logan, Woodland Pond		175
Manchester, Maquoketa River		6,025
North McGregor, Mississippi River		8,500
Riceville, Spring Brook		200
St. John's springs		200
Riverton, Belcher Lake		50
Salix, Brown Lake		300
Waterloo, Cedar River		4,050
West Bend, St. Paul Lake		150
Kansas:		
Bavaria, Willow Lake		150
Eldorado, Durachen Creek		50
Fredonia, Frater's lake		700
Gas, Rock Creek Pond		200
Greenleaf, Carrier's pond		75
Harper, Spring Creek Pond		25
Titus Pond		25
Healy, Cheyenne Creek		75
Hutchinson, Thomas Dam		30
Kingman, Wrenchey's pond		25
Lake City, Quiet Pool		25
Lane, Highland Pond		75
Manhattan, Wildcat Creek		75
Marion, Bruno Creek		50
Catlin Creek		50
Clear Creek		50
French Creek		50
Martin Creek		50
Middle Creek		75
Mud Creek		50
South Cottonwood Creek		50
Medicine Lodge, Bradshaw's pond		25
Jones's pond		25
Read's pond		25
Smith's pond		50
Wilson Creek		50
Mineral, Stone City Lake		75
Morrowville, Highland Pond		50
Newton, Gooseberry Creek		50
Peabody, Country Club Lake		50
Doyle Run		50
Gray's pond		50
Rock Island Reservoir		50
Spring Creek		50
Pittsburg, Meadowbrook Pond		200
Nevius's pond		200
Playters Lake		200
Tyro, Brick Company Pond		50
Wichita, Fennell's pond		25
Little Arkansas River		50
Wright, Fivemile Creek		30
Kentucky:		
Allensville, Mallory's pond		75
Prince Lake		150
Riley's pond		75
Ashland, Brickey Pond		100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Kentucky—Continued.		
Auburn, Freeman's pond		75
Hampton's pond		75
Hughes Branch Pond		75
Price's lake		75
Wilkerson's pond		75
Wilson's pond		75
Bardstown, City Water Works Lake		45
Finn's pond		45
Hurst's pond		45
Wilson Creek		45
Bowling Green, Big Barren River		525
Drake Creek		450
Cave Spring, Bailey's pond		150
Covington, Shinkle's pond		45
Cynthiana, Licking River, South Fork		90
Danville, Club Lake		45
DeKoven, Rudy's pond		75
Elizabethtown, Billy Creek		45
Bunnell Pond		45
Cofers Pond		45
East Rudes Creek		45
Goodwin's pond		45
James's pond		45
Reid's pond		45
Sanders Pond		45
Strother Pond		45
Toops's pond		45
Valley Creek		45
Erlanger, Lake Villa		45
Fredonia, Hamilton's lake		75
Jackson's lake		75
Lowry Lake		75
Mulberry Pond		75
Satterfield Pond		75
Stone's pond		75
Turpin Lake		75
Gracey, Giles Pond		75
Lake Annie		75
Wadlington's ponds		75
Greenville, Greenville Lake		150
Glasgow, Royalty Pond		150
Glendale, Thompson Pond		150
Henshaw, Bingham's lake		75
Dorris Pond		75
Geiger Lake		150
Hay Shed Pond		75
Henshaw Pond		150
Johnson Pond		75
Hodgenville, Hillcrest Lake		45
Slaughters Pond		45
Thomas Bayou		45
Jett Station, Cane Wood Pond		45
Latonia, Lakeview Lake		45
Lebanon, Clear Creek		45
Indian Creek		45
Meadow Creek		45
Medlock Creek		45
North Fork Creek		45
Pitman Creek		45
South Fork Creek		45
Lily, Woodward's pond		45
Lisman, Prices Slough		300
Livingston, Crooked Creek		45
Indian Creek		45
Louisville, Silver Lake		160
Ludlow, Lagoon Lake		25
Mexico, Owens Pond		75
Morning View, Elmhurst Lake		45
Munfordsville, Reppeto's pond		75
Kentucky—Continued.		
Natural Bridge, Red River		45
Nolin, Nolin River		300
Paris, Arderey Pond		45
Wood Lake		45
Pembroke, Chilton Pond		225
Hall's pond		75
Pendleton Pond		150
Rawlins Pond		150
Providence, Nesbet's lake		150
Red Oak, Hughes's pond		75
Davis's lake		75
Richmond, Ice Company Lake		45
Lake Reba		135
Russellville, Blackfords Lake		150
Givens Pond		150
Grubbs Pond		150
Landes Pond		150
Shelbyville, Heilman's pond		45
Springfield, Fairground Pond		45
GlenMary Lake		45
McElroy's reservoir		45
Stamping Ground, King's pond		45
Stanford, Buffalo Springs Lake		45
Trenton, Orchard Pond		75
Vanceburg, Kinniconnick Creek		6
West Plains, Flouring Mill Pond		75
Wheatcroft, McGill's pond		75
Williamsburg, Cumberland River		90
Winchester, Fair Acre Lake		90
Woodburn, Big Pond		75
Inglewave Pond		75
Louisiana:		
Arcadia, Field's pond		25
Bienville, Bates's pond		25
Campti, Lake Maydorf		25
Smith's pond		25
Delhi, Redfield Pond		100
Fosters Spur, Foster Bayou		50
Grand Cane, Storey's pond		25
Jonesboro, Wyatt's pond		25
Laurel Hill, Burckhalter's pond		100
Marthaville, Rains's pond		25
Swimmers' Delight Pond		25
Minden, Bopp's pond		25
New Iberia, Willow Lake		63
Quimby, Basin Pond		150
Robeline, Jordan Pond		25
Page's pond		25
Sellers's pond		25
Slidell, Salmen's pond		150
Standard, Standard Mill Pond		25
St. Joseph, Lake Bruen		125
Wisner, Anderson's pond		100
Baty's pond		100
Hess's pond		100
Hicks's pond		100
Parker's pond		100
Pennebaker's pond		100
Maryland:		
Alesia, Gunpowder River		400
Annapolis, Hackett Pond		150
Big Pool, Big Pool		250
Bruceville, Big Pipe Creek		325
Childs, Spring Lake		35
Cockeysville, Jessup Pond		200
Collington, Lake Belair		175
Woodward's lake		150
Croom, Patuxent River		250
Cumberland, Evitts Creek		325
Dorsey Lane Station, Patapsco River		100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Maryland—Continued.		
Frederick, Catoctin Creek		250
Monocacy Creek		250
Great Falls, Potomac River		225
Greensboro, Choptank River		70
Hagerstown, Antietam River		325
Lynch Station, Boston's pond		35
Salisbury, Tony Tank Mill Pond		35
Millington, Millington Mill Pond		170
Mount Calvert, Patuxent River		1,000
Ocean City, St. Martin's River		70
Rocky Ridge, Monocacy River		325
Taneytown, Bigpipe Creek		250
Walkersville, Monocacy River		325
Massachusetts:		
Boxford, Depot Pond		300
Lowes Pond		300
Concord Junction, Hat Shop Pond		200
Falmouth, Jenkins Pond		150
Fall River, Mosher Pond		125
Foxboro, Cocasset Lake		300
Greenfield, Connecticut River		200
Hyannis, Sandy Pond		550
Lexington, Willard Pond		225
Lynn, Lower Pond		150
Plymouth, King Pond		300
West ponds		300
Southbridge, Lake Tantousque		300
Webster, Chanbunagungamaug Lake		300
Peter Pond		300
West Gloucester, Wallace Pond		550
Yarmouth, Dennis Pond		800
Michigan:		
Allen, Hemlock Lake		250
Round Lake		250
Crystal Falls, Lake Mary		200
Dundee, Dundee Pond		125
Edwardsburg, Eagle Lake		375
Gaylord, Clear Lake		125
Twin Lake		125
Indian River, Burts Lake		375
Ironwood, Sutherland Lake		300
Tamarack Lake		300
Jackson, Wolf Lake		375
Ludington, Pere Marquette Lake		250
Marion, Clarks Pond		250
Muskegon, Bear Lake		250
Big Blue Lake		250
Little Black Lake		250
Mona Lake		250
Wolf Lake		500
Pentoga, Chicagon Lake		300
Saginaw, Saginaw River		500
Spring Lake, Little Black Lake		250
Twin Lakes, Stewart Lake		250
Twin Lakes		250
Minnesota:		
Alexandria, Cowdry Lake		200
Lake Agnes		100
Lake Andrews		200
Lake Geneva		200
Lake L'Homme Dieu		200
Lake Marvin		200
Lake Victoria		200
Brownsville, Mississippi River		5,750
Duluth, Island Lake		350
Eveleth, Holm's lake		200
Hokah, Lake Como		250
Minnesota—Continued.		
Le Roy, Hambrecht Mill Pond		250
Little Iowa River		600
Mineota River		250
Wildwood Pond		300
McGregor, Bass Lake		250
Mazeppa, Lake Mazeppa		300
Osakis, Lake Osakis		250
Mud Lake		200
Pengilly, Swan Lake		350
Preston, Root River, South Branch		300
Rochester, Lake Shady		350
Zumbro River, South Fork		300
Rollins, Brown and White lakes		250
Smiley, Gull Lake		350
St. Paul, Minnesota Fish Commission		816
Mississippi:		
Aberdeen, Bryant Pond		150
Cantrell's lake		250
Hunting and Fishing Club Lake		100
Long Lake		75
Meiniel Lake		150
Onofaloma Lake		300
Rosie Lake		75
Watkins's pond		150
Artesia, Guerry Meadow pond		150
Section Pond		150
Baldwyn, Outlaw's pond		100
Bewelcome, Causey's pond		125
Blue Mountain, Dunnam's pond		100
Rutherford's pond		125
Bogue Chitto, East's pond		100
Booneville, Holley's lake		175
Brook Haven, Decell's pond		75
Brookville, Haynes Mill Pond		100
Valley Lake		100
Canton, Big Lake		200
Factory Pond		150
Centerville, Dickson Pond		150
Chunky, Gressett's pond		125
Collins, Rogers's pond		100
Spring Water Pond		100
Columbia, Silver Creek Mill Pond		200
Tenmile Creek Pond		200
Columbus, Arnold Lake		150
Maer's lake		200
Mullins's lake		200
Corinth, Bellview Lake		200
Bridge Creek		100
Bynum's lake		200
Cane Creek		150
Clear Lake		150
Lake Wood		100
Lambert Lake		150
Lawson Pond		50
McAmis Pond		100
Meador's lake		200
Nash Pond		50
Scully's pond		150
Tuscumbia River		500
Wagnon's lake		50
Ward Lake		175
Waukomis Lake		500
Cotton Plant, Foley's ponds		275
Crawford, Sunset Mirror Pond		100
Crenshaw, Coleman Place Pond		100
Darling, Bear Lake		250

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Mississippi—Continued.		
De Kalb, McNeill's pond		150
Dry Run, Clear Pond		125
Ecru, Holditch's pond		125
Ethel, Crystal Pond		125
Eupora, Willow Pond		75
Guntown, Lime Pond		100
Harriton, Clearwater Pond		75
Hazlehurst, Lake Hazel		200
Lake Katheryn		200
Sexton's pond		200
Heidelberg, McLaurin's pond		125
Hermanville, Talbot Pond		150
Houston, Chitaka Pond		50
Hill's pond		50
Houston Pond		50
Kyle Pond		50
Jackson, Ellis's pond		125
Farish Pond		200
McCool, Soft Spring Pond		100
Macon, Cypress Lake		100
Oak Grove Fish Pond		100
Stewart's lake		125
Thompson Lake		125
Thompson's pond		125
Woodwardr Creek		150
Magee, Purvis's pond		100
Magnolia, Ballard Creek		150
Big Tangipahoa Creek		425
Marion, Fox Cage Pond		125
Meridian, Hanley Lake		125
New Albany, Conner's pond		50
Pine Dale Pond		50
Newton, Doolittle's pond		100
Richardson's mill pond		200
Riser Creek		150
Okolona, Buchanan's pond		50
Cooper Lake		25
East Lake		50
Okolona Lake		125
Pachuta, McGowan Mill Pond		150
Phalti Lake		500
Pineola, Ashley's pond		100
Pontotoc, Bigham's pond		150
Purvis, Allen Reed Brook		200
Boggy Hollow Creek		200
Little Black Creek		200
Sawed Horn Creek		200
Spains Lake		300
Sweatman Branch		200
Saltville, Dillard's lake		125
Shuberta, Bolon Chessa Creek		150
Shuqualak, Anderson's pond		100
Bethany's pond		50
Floore's pond		50
Parks Pond		100
Starkville, Cox Pond		25
Davis Pond		75
Ellis Pond		25
Johnson's pond		25
Wade's pond		25
Welch's pond		50
Thornton, Bee Lake		200
Tupelo, Big Lake		200
Rodgers Pond		175
Tupelo Park Lake		100
Vossburg, Cokers Mill Pond		200
Thornton's pond		100
Wahalak, Ashford Lake		300
West Point, Cedar Lake		100
McVey's pond		100
Terrell's pond		100
Wilkinson County, Fairview Pond		100
Missouri:		
Aurora, Carney Creek		50
Flat Creek		100
Jenkins		50
Little Crane Creek		900
Little Flat Creek		50
Rock House Creek		50
Blackburn, Blackburn Pond		75
Blue Springs, Blue Spring Lake		30
Chula, Larson's pond		75
Columbia, University of Missouri		6,249
Crocker, Gasconade River		50
Deepwater, Dickey's lake		50
Excelsior Springs, Regent Lake		50
Glasgow, Turtle Lake		200
Golden City, Elm Branch		25
Holmes, Bass Lake		50
Horine, Friedberg Lake		100
Hughesville, McFarlane's pond		50
Laclede, Country Club Lake		30
Medford, Medford Lake		75
Neosho, Hickory Creek		50
Nevada, Katy Allen Reservoir		75
Lake Park Springs		75
State Hospital Pond		50
North Jefferson, Brannan Lake		200
Odessa, Odessa Lake		20
Purdy, Big Flat Creek		50
Richland, Gasconade River		50
Sedalia, Arnold's lake		25
Spanish Lake, Ruegg's lake		150
St. Charles, Alexander's pond		100
Crystal Springs		150
St. Louis, Silver Lake		25
Warrensburg, Meily's lake		50
Warsaw, Turkey Creek		125
Windsor, Rock Island Lake		75
Montana:		
Cascade, Missouri River		200
Chester, Bingham's pond		200
Great Falls, Missouri River		200
Hardy, Missouri River		200
Kalispell, Lost Creek Reservoir		200
Mid Canyon, Missouri River		200
Riverdale, Missouri River		200
Ulm, Missouri River		200
Nebraska:		
North Platte, Sturges Lake		200
New Hampshire:		
Whitefield, Mirror Lake		200
New Jersey:		
Aura, Wright's mill pond		70
Blairstown, Cedar Lake		400
Bridgeton, Cohansey Creek		105
Burlington, Sylvan Lake		150
Clayton, Moore Lake		365
Dover, Paterson Canal		105
Shongum Lake		105
Upper Longwood Lake		175
Egg Harbor, Schoyer's pond		70
Hartford, Rancocas Creek		240
Murray Hill, Du Ries Pond		35
Old Bridge, Matchaponix Creek		150
Paterson, Grand View Pond		35
Passaic River		100
Spring Lake, Spring Lake		200
Tomlin, Warrington's lake		105
New Mexico:		
Albuquerque, Hubbell Pond		15
Carrizozo, Nogas Reservoir		105
Clayton, Apache Spring Pond		100
Sinica Creek		150
Dexter, Fairview Lake		25
Lake Van		25

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
New Mexico—Continued.		
Gallup, Ramah Reservoir		30
Zuni Reservoir		15
Hagerman, Samford's lake		75
Roswell, Hinds Bottomless Lake		60
Hondo River		60
Santa Fe, Miller's pond		100
New York:		
Addison, Canisteo River		245
Apulia, Labrador Lake		140
Arcade, Crystal Lake		300
Attica, Tonawanda Creek		735
Ballston Springs, Lake Desolation		175
Black Rock, Niagara River		210
Carthage, Pleasant Lake		140
Congers, Rockland Lake		105
Craryville, Copake Lake		105
East Worcester, Hudson Lake		105
Hubbardsville, Chenango River, East Branch		70
Lake Clear, Osgood Lake		300
Liberty, Lake Liberty		175
Little York, Barbar Creek		75
Little York Lake		35
Medina, Oak Orchard Creek		650
Milford, Arnold Lake		140
Mount Morris, Genesee River		100
Portlandville, Susquehanna River		175
Presho, Lake Marinus		75
Ramapo, Ramapo Lake		140
Riverside, Schroon Lake		450
Silver Springs, Silver Lake		75
Wilson, Tuscarora River		35
West Point, Sinclair Pond		75
North Carolina:		
Angier, Black River Pond		150
Burs Creek		200
Hockaday's pond		100
Matthews Pond		100
Belmont, Armstrong's pond		100
Catawba River		100
Catawba River, South Fork		100
Benson, Springwater Pond		225
Burlington, Big Cane Creek		100
Coble Pond		100
Coffman Mill Pond		100
Haw River		250
Ireland Creek		100
Little Alamance Creek		250
Stony Creek		100
Willow Brook		100
Carthage, Springwater Pond		100
Charlotte, Catawba River		150
Concord, Coddle Creek Pond		100
Dutch Buffalo Creek		200
Councils, Donahoe Pond		150
Davidson, Lake Wiley		100
Duke, Avery Creek Pond		100
Erwin Mill Pond		100
Fowler Pond		150
Dunn, Black River Pond		200
Williams's pond		150
Fayetteville, Wayside Pond		100
Folkstone, Morgan Pond		100
Franklinton, Spring Pond		200
Garland, White Lake		100
Gastonia, Lake Giles		60
Lineberger Lake		100
Gold Hill, Myers Pond		36
Graham, Alamance River		150
Hardin's pond		75
North Carolina—Continued.		
Henderson, Edward's pond		150
Lawrence Branch Pond		100
Rowland Pond		100
Hiddenite, Davis Creek		250
Ivanhoe, Beatty's Mill		150
Jackson Springs, Spring Pond		150
Kenly, Watkins's pond		100
Kinston, Kelly Mill Pond		200
Kennedy's Mill Pond		200
Lexington, Cathell's pond		100
Thompson's pond		100
Lincolnton, Little Indian Creek		150
Littleton, Johnston Mill Pond		150
Panacea Pond		250
Louisburg, Wood's pond		300
Lucama, Watson Pond		100
Magnolia, Cook's pond		75
Warter Mill Pond		100
Manchester, Little Creek		100
Mebane, Alamance Reservoir		50
Lake Weda		100
Mill Creek		150
Satterfield's pond		100
Mocksville, Harmon Creek Pond		75
Moncure, Deep River		450
Morven, Mill Creek		120
Mount Holly, Catawba River		100
Parkersburg, Jones Lake		150
Long's Mill Pond		150
Suggs Mill Pond		150
Raleigh, Hill Side Pond		80
O'Kelly Pond		200
Ramseur, Deep River		100
Millstone Creek		100
Raynham, Aaron Swamp		150
Rockingham, Hamer Pond		30
Roseboro, Gum Branch Pond		100
Smithfield, Faulkner's pond		100
Pou's pond		150
Spring Hope, Branch Pond		100
Spring Branch Pond		100
Tarboro, Cotton Factory Pond		100
Tomahawk, Clear Run Pond		100
Tuscarora, Dawson's pond		150
Union Mills, Cove Creek		200
Varina, Atkinson's pond		250
Johnson's pond		500
Jones Pond		150
Mill Pond		300
Sexton's pond		150
Wadesboro, Goulds Fork Creek		60
Grindstone Creek Lake		30
Wakulla, Lang Swamp		150
Whiteville, Benton's Mill Pond		100
Wilmington, Greenfield Lake		300
Zebulon, Pearce Pond		100
North Dakota:		
Binford, Addie Lake		100
Basswood Lake		100
Hoo-te-too Lake		100
Johnson Lake		200
Long Lake		200
Willow Lake		100
Bottineau, Spring Lake		100
Buttzville, Buttz Pond		38
Cayuga, Miller's pond		100
Devils Lake, Devils Lake		1,500
Lake Cavanaugh		100
Dogdon, Cottonwood Lake		100
Dunseith, Lake Carpenter		100
Mud River		100
Rabbit Lake		100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
North Dakota—Continued.		
Dunseith, Roblut City Lake		100
Sylvan Glen Lake		100
Ellendale, Silver Lake		100
Forman, Lake Lithia		100
Jamestown, James River		600
Lisbon, Swastika Pond		100
Rolla, Lake Kennedy		200
Ruso, Strawberry Lake		200
St. Johns, Cameron Lake		100
Cane Lake		100
Gordon Lake		100
Hoveda Lake		100
Lake Eugene		100
Wheaton Lake		100
Sykeston, Lake Hiawatha		800
Washburn, Painted Woods Lake		100
Wishek, Green Lake		250
Ohio:		
Archbold, Faunkhauser Pond		75
Beaumont, Lake Kittanning		100
Bellaire, Captina Creek		300
Camp Dennison, Little Miami River		50
Celina, Mercer County Reservoir		250
Chardon, Bass Lake		150
Chippewa Falls, Chippewa Lake		150
Cincinnati, Burnet Woods Lake		25
Lake Allyn		50
Lincoln Park Lake		25
Cleveland, Johnson's pond		100
Cuyahoga Falls, Silver Lake		150
Deshler, Railroad Reservoir		75
Epworth Heights, Little Miami River		50
Georgetown, Georgetown Reservoir		26
Kenton, Collam's pond		100
Rock Lake		100
Lisbon, Furnace Pond		100
McCutchenville, Tymochtee Lake		100
Mansfield, Park Lake		100
Piqua, Clayton Dam		75
Covington Mills Pond		75
Dohme Dam		75
Greenville Falls Dam		75
Lewis Mill Pond		75
Miami River		75
Mohlers Eddy Creek		75
Prospect, Scioto River		150
Reading, Burkhart's lake		25
Rock Creek, Park's pond		100
Solon, Sand Rock Spring Pond		100
Utica, Millbrook Pond		100
Winton Place, Chester Park Lake		25
Oklahoma:		
Ada, City Lake		100
Ardmore, Abernethy's lake		100
Adam's lake		100
Caddo Creek		100
Chickasaw Lake		100
Conlee's lake		100
Cruce's lake		100
Dyer Lake		100
Fair Lawn Lake		100
Hamilton's lake		100
Hickory Creek		100
Horse Shoe Lake		100
Ledbetter Lake		100
Love's pond		100
Mule Lake		100

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Oklahoma—Continued.		
Ardmore, Redfield's lake		100
Rod and Gun Club Lake		100
Santa Fe Pond		100
Spragin's lake		100
Walker's lake		100
Atoka, city reservoir		50
Broken Arrow, Prairie Lake		200
Byars, Chautauqua Lake		100
Coalgate, Coalgate Reservoir		50
Willow Pond		20
Durant, Shuler Park Lake		15
Gage, Pizen Dog Lake		25
Holdenville, Breeding's lake		15
McAlester, Choctaw Lake		15
Dow Lake		100
Gordon's pond		15
Tennent's pond		15
Madill, Madill Reservoir		100
Marietta, Brigg's lake		100
City Lake		100
Hickory Creek		100
Jones's pond		100
Love Lake		100
Oil Creek		200
Rock Creek		100
Simen Creek		100
Smith's lake		100
Spring Creek		100
Mooreland, Richard's pond		25
Muskogee, Illinois River		50
Illinois River, Barron Fork		120
Prague, Koutnik's pond		20
Sapulpa, Rock Creek		100
Shawnee, Maud Lake		100
Spiro, Mahar's pond		25
Stonewall, Clear Boggy River		75
Sulphur, Timber Lake		15
Tishomingo, Blue River		20
Colbert's lake		50
Mule Lake		100
Pennington Creek		150
Tulsa, Orcutt's lake		50
Wanette, French's pond		20
Weleetka, Weleetka Pond		100
Pennsylvania:		
Annandale, Slippery Rock Creek		100
Arcola, Perkiomen Creek		300
Skippack Creek		300
Bedford, Dunnings Creek		250
Raystown Branch		300
Blairsville, Locust Grove Farm Pond		100
Bloomsburg, Fishing Creek		100
Bushkill, Deer Lake		400
Forest Lake		400
Lake Taminent		400
Carbondale, Crystal Lake		100
Carlisle, Canodoquinet Creek		300
Yellow Breeches Creek		300
Centralia, Continental Dam		150
Center Valley, Mory Pond		200
Chambersburg, Conococheague River		300
Chester, Ridley Creek		400
Clarenden, Allegheny River		125
Cochranton French Creek		70
Confluence, Youghiogheny River		25
Danville, Susquehanna River		92
Doylestown, Delaware River		300
Neshaminy Creek		300

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.		
Doylestown, Tohickon Creek		300
Easton, Delaware River		800
Lehigh River		400
Ellwood City, Brush Creek		100
Connoquenessing Creek		100
Slippery Rock Creek		100
Gettysburg, Marsh Creek		250
Hallman, Pickering Creek		500
Hallstead, Susquehanna River		420
Hopewell, Raystown Branch		600
Sideling Hill Creek		300
Huntingdon, Coffee Run		250
Great Trough Creek		250
James Creek		300
Juniata River		300
Raystown Branch		600
Standing Stone Creek		300
Stone Creek		300
Lake Ariel, Lacawac Pond		100
Lake Cary, Lake Cary		100
Mud Pond		100
Lancaster, Conestoga River		600
Lenape, Brandywine River		1,400
Lewisburg, Buffalo Creek		100
Madison, Bovard's pond		100
Manheim, Bennett Hollow Creek		150
Meadville, Cussewaygo Creek		140
French Creek		210
Mechanicsburg, Conodoquinet Creek		300
Mifflinburg, Penn Creek		100
Mount Wolf, Conewago Creek		300
Nanticoke, Nuangola Lake		93
Napier, Raystown Branch		300
Norristown, Schuylkill River		300
Oaks, Perkiomen Creek		600
Schuylkill River		600
Skippack Creek		300
Orbisonia, Black Log Creek		300
Lower Aughwick Lake		300
Orwigsburg, Kummels Dam		100
Kunkels Dam		300
Peach Bottom, Susquehanna River		400
Pittston, Susquehanna River		100
Pottstown, Beaver Run		72
French Creek		75
Rahns, Skippack Creek		300
Reading, Angelica Creek		150
Cacoosing Creek		250
Hiesters Run		125
Jordan Creek		150
Maiden Creek		300
Manatawny Creek		300
Muddy Creek		250
Sacony Creek		250
Sherman Dam		125
Tulpehocken Creek		300
Rowland, Brink Lake		100
Corrila Lake		100
Lake Teedyuskung		100
Little Corrila Lake		100
Little Tink Lake		100
Whitehall Lake		100
Wolf Lake		100
Sabula, Lake Sabula		200
Saltillo, Aughwick Creek		250
Sideling Hill Creek		250
Saxton, Raystown Branch		600
Selingsgrove, Middle Creek		200
Sellersville, Branch Creek		300
Perkiomen Creek, East Branch		200
Ship Road, Marble Quarry Pond		100
Shirleysburg, Aughwick Creek		300
Sinking Springs, Tulpehocken Creek		300
Springboro, Conneaut Creek		105
Spring Mount, Perkiomen Creek		300
Star Junction, Neff's reservoir		25
Susquehanna, Page Lake		175
Telford, Perkiomen Creek, East Branch		300
Perkiomen Creek, North Branch		200
Towanda, Susquehanna River		300
Towanda Creek		100
Tremont, Buck Run Creek		200
Swatara Creek		125
Troy, Sugar Creek		100
Tunkhannock, Oxbow Pond		100
Wallingford, Crum Creek		200
Warren, Allegheny River		70
Whitford, Maull's pond		100
Yardley, Hampton Lake		100
Yerkes, Perkiomen Creek		600
York, Burmuda Creek		250
Ore Valley Pond		125
South Carolina:		
Abbeville, Branch Pond		30
Calhoun Creek		30
Gilliam's lake		30
Long Cane Creek		30
Aiken, Live Branch Pond		30
Blaney, Kirkland Mill Pond		30
Borden, Mount Springs		30
Cheraw, Pee Dee River		60
Clover, Campbell's pond		30
Catawba River		60
Crowder Creek		90
Mill Creek		30
Columbia, Cayces Pond		30
Measer Pond		40
Sixmile Creek		30
Conway, Anderson Mill Pond		30
Cowpens, Martin Mill Pond		30
Dalzell, Basin Spring Pond		30
Easley, Big Brinsky Creek		30
Brushy Creek Lake		30
Edmund, Second Creek		30
Elko, Savannah Pond		30
Everett, Cow Lick Creek		50
Gaffney, Broad River Pond		30
Cherokee Pond		30
Great Falls, Fishing Creek		9
Greenville, Mill Reservoir		30
Paris Mountain Reservoirs		120
Greers, Tiger River, South Branch		30
Honea Path, Broad Mouth Creek		120
Little River		30
Jefferson, Baker Creek		50
Lynch River		50
Kershaw, Baskins Mill Pond		30
Dease Mill Pond		30
Haile Mine Pond		120
Ledbetter Creek Pond		30
Landrum, Pacolett River, North Fork		2,000
Lockhart, Bullock Creek		30

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
South Carolina—Continued.		
Lowndesville, Rocky River		30
Savannah River		60
Lucknow, Scott Pond		50
Marietta, Saluda River		355
Mount Croghan, Richardson Pond		30
Mullins, Little Pee Dee River		30
Norton Mill Pond		30
Neeses, Bonnett's pond		30
Otranto, Goose Creek		30
Pelzer, Saluda River		60
Pickens, Oolenoy Creek		30
Rachels Creek		30
Twelvemile Creek		30
Pomaria, Frog Pond		30
Old Mill Race		30
Second Creek		30
Wicker Pond		30
Riverside, Cane Creek		25
Catawba River		80
Waxhaw Creek		25
Rock Hill, Fishing Creek		30
Little Dutchman Creek		30
Martin's lake		30
Sanford, Cane Branch Pond		30
Seneca, Cane Creek		30
Keowee River		30
Little River		30
Spartanburg, Glen Cove		90
Lawsons Fork Creek		90
Whitney Pond		90
St. Matthews, Mill Pond		30
Sumter, Green Swamp		30
Mason's pond		30
Taylors, Long Branch Pond		30
Tirzah, Campbell's pond		30
Catawba River		30
Southern Pine Pond		30
Trenton, Harris Creek		30
Hillard Creek		30
Long's pond		30
Shaws Creek		30
Tiger Creek		30
Troy, Caffey Town Creek		15
Hard Labor Creek		15
Kennedy's pond		45
Long Cane Creek		15
Walhalla, Cane Creek		30
Chauga River		60
Coneross Creek		30
Hell Hole Creek		30
Little River		60
Village Creek, East Fork		30
Village Creek, Middle Fork		30
Village Creek, West Fork		30
Ware Shoals, Saluda River		60
Wellford, Tiger River Mill Pond		30
Willington, Little River		60
York County, Catawba River		200
Yorkville, Allison Creek		20
Beaver Dam Creek		70
Catawba Creek		20
Clarks Fork		20
Crowder Creek		40
South Dakota:		
Alpena, Barber's lake		125
Richards Lake		125
Altamont, Lake Alice		400
Armour, Lake Andes		100
Belvidere, Belvidere Lake		200
South Dakota—Continued.		
Bradley, Stover's lake		125
Britton, Clear Lake		350
Ninemile Lake		350
Star Lake		350
Bruce, Oakwood Lake		350
Canova, Kroegers Lake		200
Carthage, Heidt's Lake		125
De Smet, Lake Henry		700
Lake Thompson		350
Spirit Lake		350
Diamond, Lake Traverse		125
Draper, Vernon Pond		100
Eureka, Long Lake		175
Gettysburg, Schreiber's pond		125
Gregory, Bull Creek		175
White Lake		350
Groton, Crystal Lake		100
Harrold, Sunny Slope Lake		100
Hecla, Nordholm's pond		175
Interior, Kyle Lake		200
Lake Preston, Lake Henry		350
Lake Thompson		175
Lane, Flowing Wells Lake		125
Lennox, Lake Alberts		250
Lesterville, Mueller's lake		175
Letcher, Letcher Lake		175
Mitchell, Firesteel Creek		200
James River		200
Rock Creek		200
Murdo, Murdo Pond		125
Okaton, Stangl's dam		150
Orient, Lake Dienslake		300
Parkston, Baumbach's lake		125
Grass Lake		125
Lang's lake		125
Reiswig's lake		125
Twelvemile Creek		125
Philip, Robinson's pond		175
Pierre, Phillips Pond		175
Presho, Boe's pond		150
Tompkins's pond		100
Redfield, Twin Lakes		700
Sisseton, One Road Lake		1,125
Twin Brooks, Punished Woman Lake		400
Volga, Tetonkaha Lake		175
Wentworth, Brant Lake		175
Woonsocket, Lake Prior		125
Tennessee:		
Adams, Brush Creek		300
Lawrence's pond		200
Red River		700
Sulphur Fork Creek		350
Alleghany, McCulloch's pond	1,000	
Athens, Goodfield Creek		1,000
Snees Creek		3,000
Belvidere, Calaway Pond		200
Long Pond		200
Brighton, Bell's pond		150
Cedar Hill, Sulphur Fork Creek		800
Woodard's pond		200
Chattanooga, Chickamauga Creek, North Fork		100
Chickamauga Creek, South Fork		100
Chickamauga Creek, West Fork		100
Lake View		100
Lookout Creek		100
Richmond Spinning Company reservoir		100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Tennessee—Continued.		
Chattanooga, Stringers Creek		100
Clarksville, Red River		300
Cleveland, Harris Creek		100
Wildwood Lake		300
Coal Creek, Coal Creek		300
College, Sequatchie River		100
Del Rio, Big Creek		125
Flintville, Flint River		300
Fosterville, Barnes's pond		150
Gallatin, Baber's pond		300
Bruce's pond		200
Greenville, Highland Avenue Lake		150
Hampton Station, Randle's pond		150
Hartsville, Meador's pond		150
Hickory Valley, Avent's ponds		75
Highcliff, Clear Fork River		300
Hills Station, Duck River		250
Jackson, Crystal Lake		100
Goggle Eye Lake		100
Johnson City, Watauga River		10,000
Knoxville, Holstan River	4,000	
Limestone Lake	1,000	
Little River	7,000	
Spring Lake		250
Spring Place Pond	1,000	
Lewisburg, Richland Creek		300
Loudon, Little Tennessee River	3,000	
Tennessee River	3,000	
McKenzie, Guins Creek		250
McMinnville, Barren Fork River		250
Mohawk, Lick Creek		300
Morrison, Lake Mary		250
Nashville, State Capitol Pond		300
Welsh's pond		250
Orlinda, Babb's pond		150
Crocker's pond		150
Red River, North Fork		350
Summers Branch		250
Persia, Beech Creek		100
Dodsons Creek		100
Robinson Creek		100
Philadelphia, Meadow Brook Lake		150
Paint Rock Creek		250
Sweetwater Creek		300
Towle's pond		1,000
Pikeville, Sequatchie River		200
Rogersville, Big Creek		100
Caney Creek		100
Crocketts Creek		100
Poor Valley Creek		100
Smyrna, Mill Pond		250
South Pittsburg, Battle Creek		250
Sparta, Knowles and Price's lake		150
Springfield, Murphy's pond		200
Red River, South Fork		750
Sulphur Fork Creek		650
Tazewell, Carr's lake		175
Tellico Plains, Tellico River		3,000
Townsend, Little River	3,000	
Trenton, Rodgers Lake		50
Waldensia, Mammy Creek Lake		250
Walland, Little River	3,000	
Wauhatchie, Cummings Spring Branch		100
Whitwell, Sequatchie River		100
Texas:		
Alba, Price's ponds		500
Alvord, Speer's pond		30
Alvarado, Thompson's lake		200
Texas—Continued.		
Amarillo, Amarillo Creek		160
Annono, Crystal Lake		300
Athens, Black Lake		300
Black Branch Lake		514
Gallamore Lake		300
Koon Klub Lake		833
Long Lake		300
Red Land Lake		50
Round Lake		300
Miller's pond		50
Austin, Austin Lake		847
Barry, Woodward's lake		125
Big Sandy, Lake Everman		1,667
Blooming Grove, Massengale's pond		100
Blossom, Lake Edward		200
Bobbin, Texas Company's reservoir		100
Bremond, Lake Gin		100
Bronson, Jack Creek Spring		100
Willow Lake		30
Brownsville, Lake Guerra		1,000
Brownwood, Allison's pond		300
Bell's pond		1,000
Brownwood Club Lake		2,000
Camp's pond		150
Knape's lake		1,000
Lake Coggin		1,000
Liveoak Lake		200
Willis Creek		100
Buda, Bear Creek		200
Onion Creek		200
Burlington, Barclay Mill Pond		100
Lake Barclay		50
Burton, Bradfield Lake		100
Caldwell, Barnett's pond		20
Fay Lake		20
Haddox Pond		20
Hartgroves's lake		20
McGee Lake		20
Cedar Bayou, Hanus Lake		100
Center, Crow Lake		65
Kitchen's pond		80
Chandler, Cade's lake		1,000
Hick's pond		90
Twin Lakes		165
Childers, Lake Keeler		140
Chilton, Rell's lake		100
Clarksville, Carter Lake		500
Country Club Lake		1,500
Delaware Pool		300
Donoho's pond		200
Igo's lake		500
Lake Jamison		500
Stout Lake		500
Coleman, Mustang Creek		1,000
Wild Cat Creek		1,000
Conroe, Byspot Lake		150
Copperas Cove, Copperas Cove Lake		200
Corsicana, Benton's pond		100
Corsicana Fish Association Pond		150
Nevarro Refining Company's reservoirs		850
Townsend's pond		150
Water Works Pond		150
Cotulla, Black Hill Lake		300
Butler Lake		200
Cotulla Lake		200
Horse Head Lake		300
Vincent Lake		500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Texas—Continued.		
Dallas, Highland Park Lake		500
D'Hanis, Polk's pond		50
De Kalb, Elliot's lake		100
Jones's lake		500
Hayes Park Pond		150
Derby, Mule Creek Pond		75
Detroit, Oil Mill Pond		250
Eagle Pass, Almos Lake		75
Bibiro Lake		500
Farias Lake		600
Eddy, Hoolia Pond		50
Electra, China Creek		238
Forked Pond		237
Elgin, Berg's lake		300
Elmendorf, San Antonio River		300
Ennis, Farris Pond		76
Willow Lake		76
Ferris, Stainback's lake		50
Florisville, Post Oak Creek		400
Fostoria, Smith's pond		75
Womack's pond		100
Ganahl, Guadalupe River		50
Gaston, Oyster Creek		300
Gilmer, Enon Lake		50
Grapeland, Bobbitt Lake		300
Horse Shoe Lake		300
Myrtle Lake		500
Woodanor Lake		150
Green, Scroeders Pond		300
Greenbrier, Beckham Lake		200
Greenbrier Lake		300
Indian Lake		200
Greenville, King Lake		300
Lillie Lake		300
Oak Lake		300
Groesbeck, Williams's lake		100
Groveton, Mill Pond		400
Hallsburg, Starkey's pond		200
Hamlin, Hamlin Lake		26
Harlingen, Almito Lake		1,000
Hubbard, Ashcroft's pond		200
Jones's pond		300
King Pond		200
Long Pond		200
Huntington, Cowart's pond		75
Hutchins, Dallas Club Lake		400
Farmers' Club Lake		330
Kenny, Pfeffer's pond		50
Kingston, Gleen-Wood Pond		30
Kosse, Elm Lake		100
Ezell's lake		50
Forbes's pond		50
Kyle, Coffee Lake		50
La Grange, Emmett Smith Lake		50
Laredo, Aguilare Lake		1,300
Sanchey and Johnson's ponds		112
Ledbetter, Stuermer's pond		50
Livingston, Darnell's lake		70
Llano, Llano River		7,200
Lott, Williams Park Lake		50
McCaulley, Wilson's pond		13
McDade, Milton's pond		50
McKinney, McKinney Fishing and Hunting Club Lake		400
Nursery Pond		100
Manchaca, Onion Creek		200
Slaughter Creek		100
Manor, Eppright's pond		20
Mansfield, Walnut Creek		400
Mayotown, Mud Creek		200
Memphis, Barton Lake		55
Morrill, Lake Henrietta		400
Mount Calm, Rush's lake		100
Mount Selman, Brock's lake		300
Carlton's lake		100
Wade's lake		300
Nacogdoches, Moral Creek		425
Naples, Mill Pond		300
Moore's pond		100
Vada Lake		200
New Braunfels, Guadalupe River		2,000
Paris, Nash's pond		100
Pearsall, Campbell's pond		40
Plano, White Rock Creek		100
Riviera, Laguna De Riviera De Cavallos		500
Laguna Sandia		500
Riviera Pond		500
Rockland, Green Beach Pond		200
Rosebud, Schmid's lake		50
San Angelo, Kickapoo Creek		1,000
Water Valley Country Club Lakes		1,000
San Antonio, Wilkin's lake		88
San Augustine, Sandy Land Pond		50
San Benito, San Benito Canal Lake		2,000
Sherman, Sherman Country Club Lake		1,000
Shiner, Spring Branch		100
Skidmore, Agler Lake		400
Somerville, Big Lake		1,048
Campbell's lake		122
Fullers Lake		280
Spofford Junction, East Pinto Creek		600
Sweetwater, Rucker's pond		13
Taylor, Ake's lake		100
Eckhardt's lake		300
Flag Springs ponds		200
Terrell, Asylum Lake		495
Breeden Lake		400
Bowen's lake		100
Butler's pond		100
Cain's lake		100
Cartwright Lake		200
Davis's lake		200
Gill's pond		100
Goodman Pond		100
Griffith Lagoon		40
Hollarn's lake		100
Ingram Pond		100
Johnson Lake		200
Laurence's pond		200
McGinnis Pond		200
McKinney's pond		100
Martin's pond		200
Massey Pond		100
Meridith's lake		200
Noble's pond		200
Overton's pond		100
Patton's pond		200
Price's pond		125
Scott's pond		100
Smith's lake		100
Swindell Club Pond		200
Terrell Cotton Mill Pond		200
Trout Lake Club Pond		125
Wilson Pond		200
Texarkana, Boston Road Water Works Lake		64
Ghio Spring Lake		156
Temple's lake		500

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Texas—Continued.		
Thorndale, Patschke's lake		150
Thornton, McClelland's lake		50
Tyler, Caney Lake		1,000
Country Club Lake		150
Funderburgh's lake		100
Goodman's lake		1,000
Lakewood Lake		900
Lake Park Lake		150
Piscatorial Club Lake		900
Rowland Lake		950
Smith County Fish Club Lake		1,000
Spring Lake		100
Tucker Lake		900
Tyler Fishing Club Lake		825
Uvalde, Elpeloncillo Lake		150
Leon Creek		1,000
Wills Point, Bermuda Lake		100
Dickards Gin Lake		40
Fields's pond		100
Johnson Gin Pond		40
Oil Mill Lakes		80
Winona, Farmer's pond		100
Kay's pond		300
Starnes's pond		100
Winsboro, Stivers Club Pond		500
Yorktown, Echkardt's pond		50
Vermont:		
Hydeville, Lake Bomoseen		400
Johnson, Lake Eden		300
Virginia:		
Basic City, Lithia Spring		30
Beaver Dam, Little River Mill Pond		35
Broadway, Shenandoah River, North Fork		70
Charlottesville, Mont Eagle Pond	1,000	
Turk Branch	2,000	
Morningside Pond	1,000	
Claremont, Sandy Point Ice Pond		8
Clifton Forge, Jackson River		105
Corapeake, Jones's Mill Pond		100
Crimora, Woods's reservoir		35
Culpeper, Hazle River		70
Danville, Gilbert's pond		400
Dan River		350
Riverside Lake		600
Dillwyn, Slate River		70
Disputanta, Disputanta Pond		400
Edenburg, Stony Creek		70
Emporia, Bryant's Mill Pond		70
Three Creeks		70
Fort Mitchell, Ashworth's pond		100
Fredericksburg, Boscobel Pond		100
Fries, New River	1,000	
Front Royal, Shenandoah River		325
Galts Mills, Stovall Creek		35
Gordonsville, Atkinson's pond		35
Harrisonburg, North River		70
Holdsworth, Stephens Pond		100
Honaker, Thompson Creek		30
Deel's pond		34
Fletcher's pond		31
Limestone Pond		34
Ivy Depot, Moormans River		70
Jarrath, Nottoway River		70
Jenkins Ford, Jackson River		105
Lexington, North River		105
Manassas, Deer Park Lake		100
Occoquan River		300
Virginia—Continued.		
Manassas, Tubbs's pond		100
Meadow Station, Watkins's Mill Pond		35
Middletown, Cedar Creek		650
Millsboro, Cowpasture River		105
Mineral, Whitlock's mill pond		35
Mount Jackson, Shenandoah River, North Fork		140
Newsoms, Gum Pond		45
Orange, Rapidan River		70
Sharon Lake		70
Pearisburg, Walker Creek		189
Rapidan, Rapidan River		70
Richmond, Gebhardt Pond		70
Hermitage Pond		35
Lacy Pond		35
Licking Creek Pond		35
Meadow Pond		70
Strawberry Hill Mill Pond		35
Rectortown, Goose Creek		250
Remington, Rappahannock River		105
Ridgeway, Matrimony Creek		1,000
Roanoke, Mason Creek		800
Rockfish, Rockfish River	1,500	
Sharps, Union Mill Pond		200
Somerset, Rapidan River		70
Staunton, Middle River		140
Stony Creek, Stony Creek		70
Strasburg, Shenandoah River		325
Shenandoah River, North Fork		70
Shenandoah River, West Fork		325
Sutherlin, Double Pond		100
The Plains, Goose Creek		625
Toano, Warren's pond		35
Walkers, Johnston Creek		35
Walkerford, James River		105
Warsaw, Wellford's pond		200
Waynesboro, South River		29
West Point, Ray's Neck Mill Pond		100
Wise, Purkey's pond		38
Whittens Mills, Clinch River, North Fork		72
Wythe County, Reed Creek		164
Washington:		
Bellingham, Lake Luna		300
Bossburg, Williams Lake		200
Columbus, Blanchard's lake		150
Scotia, Diamond Lake		350
Tacoma, Lake Kapousin		250
Vista, Fish Trap Lake		300
West Virginia:		
Chapmansville, Guyandotte River		175
Cove Run, Sandy Creek		400
Curtin, Gauley River		300
Elm Grove, Wheeling Creek		250
Fort Spring, Second Creek		140
Gladwin, Glady Creek		300
Grafton, Tygart Valley River		400
Hampshire County, Great Capon River		650
Inwood, Back Creek		575
Hog Creek		125
Middle Creek		200
Mill Creek		250
Wappocomo, Potomac River, South Fork		400
Winchester, Hogue Creek		250

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin:		
Augusta, Dells Pond		300
Babcock, Yellow River		300
Bangor, Dutch Creek		225
Barron, Cedar Lake		300
Beaver Dam, Beaver Dam Lake		400
Birchwood, Berry's lake		300
Eel Lake		300
Elizabeth Lake		200
Horseshoe Lake		300
Long Lake		400
Slim Lake		350
Spider Lake		300
William Lake		200
Black River Falls, Perry Creek		225
Burlington, Brown Lake		300
Cable, Big Brook Lake		150
Cable Lake		400
McClaine Lake		400
Mud Lake		400
Number Four Lake		300
Swanson Lake		400
Wiley Lake		200
Colgate, Lake Five		300
Cumberland, Beaver Dam Lake		300
Kirby Lake		300
Sand Lake		300
Eleva, Mill Pond		650
Fond du Lac, Lake de Nevue		600
Long Lake		300
Grand Rapids, Wisconsin River		10,000
Hatfield, Water Power Lake		375
Haugen, Bear Lake		600
Hawkins, Shamrock Lake		300
Hayward, Smith Lake		450
Independence, Bugle Lake		600
Iron River, Big Angus Lake		300
Crystal Lake		300
Eau Claire Lake		350
Elbow Lake		300
Everett Lake		300
Hart Lake		300
Iron Lake		300
John Lake		300
Wisconsin—Continued.		
Iron River, Little Angus Lake		300
Pike Lake		300
Spider Lake		300
La Crosse, Mississippi River		5,750
Lake Beulah, Lake Beulah		300
Lake Nebagamon, Gander Lake		400
Lake Nebagamon		500
Minnesung Lake		450
Nigger Lake		400
Laona, Birch Lake		300
Rat Lake		300
Silver Lake		300
Lodi, Fish Lake		225
Lublin, Diamond Lake		300
Mattoon, Cranberry Lake		150
Mauston, Mauston Mill Pond		300
Merrillan, Trows Mill Pond		300
North Lake, North Lake		300
Osseo, Mill Pond		300
Pelican, Dry Lake		300
Lake Enterprise		300
Pelican Lake		450
Rice Lake		300
Prairie du Chien, Mississippi River		7,000
Princeton, Fox River		300
Plymouth, Crystal Lake		300
Schleisingerville, Cedar Lake		300
Sobieski, Bass Lake		150
Sparta, Algra's pond		150
Superior, Lost Lake		500
Wonewoc, Baraboo River		300
Wyoming:		
Cheyenne, Lake Minnehaha		100
Kirby, Big Horn River		400
Parkman, Cooper's reservoir		250
Sheridan, Milward's pond		200
Moore's reservoir		200
Shoshoni, Big Horn River		200
Total[a]	32,500	540,962

BREAM (SUNFISH).

Disposition.	Fingerlings, yearlings, and adults.
Alabama:	
Adamsville, Linn's pond	100
Andalusia, Clearwater Pond	75
Jeter's pond	75
Simmons's pond	75
Anniston, Cane Creek	220
Ashland, Dean's pond	75
Banks, Brown's Mill Pond	150
Bay Minette, Stapleton Pond	75
Beaverton, Beaver Creek	200
Birmingham, Bynum's pond	75
Blocton, Hill Creek	75
Lick Log Creek	75
Chambers County, Wild Wood Pond	200
Calhoun, Bell's Mill Pond	200
Camden, Sharp Pond	100
Alabama—Continued.	
Carrolton, Lubbub Creek	200
Childersburg, Lake Bon Air	100
Collinsville, Big Wills Creek	100
Dothan, Little Choctawhatchee Mill Pond	300
Elba, Exalster Pond	125
Enterprise, Hildreth Pond	100
Lary's pond	100
Park's pond	75
Ethelsville, Baptist Spring Pond	100
Bell Pond	125
Cook Lake	100
Eufaula, Richards Pond	75
Fayette, Johnson's lake	100
Marshall's pond	100

[a] Lost in transit, 20,812 fingerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

BREAM (SUNFISH)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Alabama—Continued.	
Fayette, Spring Creek	100
Five Points, Pearce's pond	100
Foley, Watson Creek Pond	100
Fort Payne, Bear Creek	55
Yellow Creek	55
Geneva, Little Limestone Creek	75
Georgiana, L. and N. Reservoir	300
Goodwater, Hatchet Creek	200
Gordo, Dunn Creek Spring	125
Elmore's pond	125
Roper Branch Pond	100
Sullivan's pond	125
Hanceville, Ashwander's pond	75
Hartford, Child's pond	125
Hatcher's pond	125
Headland, Hodges's pond	150
Heflin, Lawn Pond	55
Huntsville, Kelly's pond	150
Jones, Spring Branch Pond	75
Willow Lake	100
Keystone, Keystone Pond	75
Knoxville, Spring Pond	125
Lee County, Oakland Pond	100
Linden, Beech Lake	75
Lineville, Crooked Creek Pond	250
Spear's pond	100
Fox Creek Pond	125
Gold Branch	125
Livingston, Hawkins's pond	125
Longview, Longview Lake	75
Lowndesboro, Dickson's pond	75
Ewings's pond	75
Long Pond	75
Stone's pond	75
Luverne, Big Patsaliga River	150
Sikes's mill pond	75
Mapleville, Byrd Creek	250
Marion, Brown's pond	75
Tubbs Springs	75
Millport, Darr's pond	100
Monroe, Daniels Pond	100
Montgomery, Gay's pond	100
Stewart's reservoir	100
Taylor Branch	150
Youngblood Creek	150
Montevallo, Mahone Creek	325
Opelika, Lime Spring Pond	100
Murphy's pond	100
Spring Pond	75
Tucker's pond	125
Ozark, Echo Springs Branch	75
Wallace Pond	75
Phil Campbell, Larrell Branch	125
Pickens County, Clarks Pond	100
Pinckard, Borland Mill Pond	200
Pittsview, Pitts's ponds	310
Russell's pond	150
Plantersville, Spencer's pond	125
Prattville, Davis's pond	250
William Branch	75
Reform, Easterling's pond	300
Rendalia, Riser's pond	75
Roanoke, Weoka Creek	75
Samson, Cruse's pond	75
Sanford, Lake Dinkins	75
Scotts Station, Hogue's pond	75
Seale, Bush's pond	75
Dudley's pond	75
Selma, Bayne Pond	75
Slocomb, Aus-Kel Mineral Springs	100
Sulligent, Tooks's pond	125
Willow Pond	100
Tennille, Walnut Creek Mill Pond	200
Union Springs, Walker Pond	150
Arizona:	
Bisbee, Five V Ranch Pond	100
Kirkland, Park Creek Pond	100
Arkansas:	
Hacket, Rooch's lake	125
Little Rock, Hinton's pond	250
Monticello, Williamson's pond	125
Warren, Mill Pond	150
California:	
Amedee, California Fish Commission, Honey Lake	450
Bakersfield, California Fish Commission, Kern River	350
Colfax, California Fish Commission, Lake Vera	200
Fresno, King River	150
Lake County, California Fish Commission, Clear Lake	600
Los Angeles, Cronenwett Pond	150
California Fish Commission, Freeman River	375
California Fish Commission, Russell Lake	300
Lake Siena	375
Marsh Pond	375
Marysville, California Fish Commission, Feather River	150
Sacramento, California Fish Commission, Brushy Lake	200
California Fish Commission, Pluma Lake	150
California Fish Commission, Sutterville Lake	125
California Fish Commission, Washington Lake	100
Stockton, California Fish Commission, San Joaquin River	600
Tehachapi, Clark Lake	75
Florida:	
Chipley, Blue Pond	100
Snea, Culverton Pond	125
Taylorsville, David Lake	200
Georgia:	
Ashburn, Coon Thick Pond	125
Eastland Lake	200
Athens, Cooling Pond	55
Ice Company Pond	55
Lake Chulnota	150
Atlanta, Brown's mill pond	100
Clara Lou Pond	300
Dingly Dell Pond	55
Felker's pond	55
Howell's pond	200
Sim's lake	55
Augusta, Carmichael Club Pond	125
McKie's pond	200
Avera, Red Hill Branch Pond	125
Ball Grounds, Roberts's pond	55
Barnesville, Sikes's pond	50
Wellmaker's pond	125
Yates and McCrary's pond	50
Bethlehem, Mineral Pond	125
Blue Ridge, Wheelers Spring	110
Box Springs, Lake Samoki	350
Bradley, Bradley Pond	100
Buena Vista, Moody Pond	100
Cairo, Merritt's pond	200
Wamble's pond	50
Wright's pond	50
Canon, Agnew's pond	100
Cedartown, Gleen Pond	55
Judkins Pond	55
Lockes Lake	55
Neese Pond	55

Details of Distribution of Fish and Fish Eggs—Continued.

BREAM (SUNFISH)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Georgia—Continued.	
Clayton, Chechew Creek	150
Tallulah Pond	300
Collins, Adamson's pond	200
Columbus, Bonnigongamog Lake	100
Garrard's pond	100
St. Elmo Lake	100
Wildwood Park Lake	125
Comer, Beaver Dam Creek	150
Spring Branch	150
Commerce, North Oconee River	150
Conyers, Rockdale Pond	100
Coolidge, Murphy's pon	200
Crawfordsville, Holden's pond	125
Miller Pond	110
Moore's pond	100
Cunningham, Spring Branch	55
Spring Pond	55
Cusseta, Log Cabin Pond	100
Dacula, Wilson Pond	100
Dallas, Clay Pond	55
Dalton, Camp's lake	250
Dawson, Chichasawhachee River	75
Ichawaynochaway River	75
Devereux, Logdam Creek	250
Donalsonville, Brook's pond	100
Elberton, Broad River	100
Ellaville, Little Muckalee Pond	100
Fairmont, Finley Creek	125
Railroad Pond	150
Salacon Creek	200
Fitzgerald, Naomia Lake	200
Flowery Branch, Cold Spring	150
Forsyth, Owen's pond	100
Fort Valley, Ohio Lake	125
Haddock Station, Jim Springs	125
Harlem, Spring Branch Pond	125
Hartwell, Kidd's spring	100
McCurry's pond	100
Powder Bag Creek	100
Homerville, Dickerson's pond	100
Howard, Mill Pond	100
Inaha, Byrd Pond	100
Jefferson, Hardy Mill Pond	50
Hayes's pond	50
Jefferson Cotton Mills Pond	250
Jeffersonville, Vaughn's pond	150
Junction City, Moore's pond	100
Juniper, Black Creek Pond	100
Lake Park, Long Pond	200
Ocean Pond	400
Sunset Lake	200
Lawrenceville, New Hope Springs	125
Louisville, Little's pond	150
Lula, Town Creek	200
McBean, Knight's pond	150
McDonough, Lowe's pond	100
Macon, Fairy Dell Pond	100
Madison, Forest Pond	200
Midland, Jenkins's ponds	55
Milner, Spring Pond	100
Monroe, Peter's pond	110
Moreland, Brannon Spring Pond	55
Morgan Falls, Chattahoochee River	100
Moultrie, Giles Mill Pond	100
Murphy's pond	100
Mount Airy, Fort's pond	150
Nelson, Spring Pond	55
Newman, McIntosh Mill Pond	150
Nicholson, Crooked Creek	150
Norcross, Johnston's pond	150
Ochlochnee, Ella Belle Pond	125
Long's pond	100
Magnolia Pond	125
Ochlochnee Pond	225
Poplar Pond	100
Willow Pond	100
Odessadale, Geauton's pond	55
Palmetto, Nix's pond	55
Paschal, Leonard's pond	100
Perry, Ingleside Lake	100
Preston, Nicholson Mill Pond	100
Quitman, Sea Pond	200
Renfroes, Branch Pond	100
Spring Pond	100
Richland, Old Bell Pond	100
Rocky Ford, Horse Creek	200
Rome, Armstrong's pond	55
Flat Woods Lake	55
Lavender Pond	55
Skinner Pond	55
Wood's pond	55
Royston, Nails Creek	100
Sandersville, Stacer's pond	100
Savannah, Savannah Pond	150
Screven, Brady's pond	100
Seney, Kerr's ponds	55
Seville, Blue Sink Pond	200
Spring Creek	100
Skipperton, Skipper's pond	100
Slocumb, Bermuda Pond	100
Social Circle, Lake Louise	100
Sparta, Archer Pond	200
Sleepy Hollow Lake	200
Talbotton, Freeman's pond	100
Maxwell's pond	100
Talking Rock, Bradley's pond	55
Wood's pond	55
Thomson, Maddox Creek Pond	150
Marshall Spring Branch	500
Tifton, Cotton Mills Pond	150
Molasses Lake	100
Rice Lake	200
Ty Ty, Nipper Pond	100
Valdosta, Staten's lake	100
Walls Crossing, Walls Pond	100
Warrenton, McGregor's pond	150
Pecan Pond	150
Stage Branch Pond	100
Washington, Little River	200
Whigham, Quinn's pond	50
Woodbury, Betts's Mill Pond	55
Illinois:	
Buncombe, Kellers Mill Pond	110
Carbondale, Club Lake	220
Snyder Lake	220
Christopher, Patton's pond	110
Pana, Lake View Pond	110
Meredosia, Illinois River	116,400
Meredosia Bay	700
Indiana:	
Alexandria, Little Pipe Creek	150
Farmersburg, Lewis Pond	125
Fort Wayne, East Lake	125
Lake Everett	125
Little East Lake	125
South Spring Lake	125
Greensburg, Shelborn's pond	100
Lebanon, Newman's pond	125
Markleville, Wisehart's pond	200
Muncie, Eltrose Pond	150
Portland, Degler's pond	100
Shelbyville, Brandywine Creek	150
Sheridan, Mace's pond	150
Summitville, Bronnenberg's pond	250
Iowa:	
Arlington, Clear Water Lake	150
Atlantic, Vidt Soe Pond	125
Dexter, Kauffman's pond	75
Meadow Pond	50
Newton, Livingston's pond	225
North McGregor, Mississippi River	29,000

Details of Distribution of Fish and Fish Eggs—Continued.

BREAM (SUNFISH)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Kansas:	
Dellvale, Morrison's pond	220
Erie, Fairview Pond	330
Helper, Silver Lake	330
Leoti, Langley's pond	110
Medicine Lodge, Palmer's pond	150
Kentucky:	
Arlington, Summers's pond	110
Auburn, Appling Pond	50
Cherokee Lake	50
Clear Water Brook	50
Haden Pond	50
Price Pond	100
Rogers's pond	50
Campbellsville, Caney Fork Creek	80
Coakley's pond	85
Frankfort, Bailey's pond	55
Fredonia, Moore's pond	100
Stone's pond	100
Hodgenville, Woods Pond	55
Lawrenceburg, Elliston Pond	110
Lexington, Bullock Pond	55
Hillenmayer's pond	55
London, Little Laurel River	110
Millersburg, Layson's pond	55
Mount Sterling, Apperson's ponds	55
Wyatt's pond	55
Young Pond	55
Paint Lick, Arnold's lake	55
Winchester, Fair Acre Lake	110
Louisiana:	
Many, McCraw's pond	100
Marthaville, Locke's pond	125
Spring Pond	125
New Iberia, Sweet Pond	150
Robeline, Jordan Pond	175
Page Pond	175
Maryland:	
Bel Air, MacNabb's pond	225
Meadow Pond	100
Great Falls, Potomac River	22,800
Vale Summit, Blue Clay Pond	100
Minnesota:	
Brownsville, Mississippi River	11,350
Mississippi:	
Aberdeen, Gay's lake	200
Jandon's pond	100
Ackerman, Blain's pond	300
Leonard's pond	100
Agricultural College, Mayfield Farm Pond	150
Algoma, Newell's pond	125
Amory, Camp's pond	200
Baldwyn, Bishop's Mill Pond	200
Biloxi, Siesta Pond	150
Blue Mountain, Cagle Pond	125
Brooksville, Moore's Lake	150
Scales's pond	100
Willow Pond	200
Burnside, Lake Burnside	200
Carrollton, Catesworth Pond	100
Cedar Bluff, Tribble's pond	225
Centreville, Anderson's pond	200
Ash's pond	125
Columbus, Lake Katherine	400
Corinth, Billswell Lake	300
Bynum Lake	100
Cogdell's lake	150
Lake Mary	150
Lake Minnehaha	150
Lake Viola	150
McClamroche's lake	150
Osborne's pond	150
Sidney Lake	100
Ward Lake	150
Waukomis Lake	200

Disposition.	Fingerlings, yearlings, and adults.
Mississippi—Continued.	
Corinth, Wilford Lake	150
Zumbrock's pond	150
Cotton Plant, Rucker's pond	125
Cranfield, Cranfield's pond	100
Crawford, Grab All Farm Pond	150
Harvey's pond	150
Decatur, Day's Mill Pond	50
Dry Run, Como Pond	150
Galey Pond	150
Hatchery Pond	150
Spring Pond	150
Youngs Pond	150
Duck Hill, Sledge's pond	175
Eden, Vandever's pond	100
Ellisville, Eaton Lake	125
Gloster, Bates Pond	150
Robinson's pond	150
Hernando, Banks Pond	100
Hickory, Everett's pond	150
Houston, Marion's pond	125
Jackson, Ashland Pond	100
Elon Pond	100
Kosciusko, Cain's pond	100
Kossuth, Jordon Pond	150
Lexington, Gwinton Pond	100
Lofstrom's pond	125
Lorman, Tanner's pond	100
McDonald, Spring Pond	125
Maben, Thomas Pond	200
Macon, Anderson's pool	100
Brantley Pond	100
Carr's pond	100
Colbert Pond	100
Conner's lake	100
Cunningham's pond	100
Daisy Lake	100
Edgerton Pond	100
Eiland Pond	125
Harkin's pond	100
Howards Lake	300
Lake View	100
Lomand Pond	100
Louise Lake	100
Lucas Pool	100
Minor's pond	100
Mississippi Lake	100
New Pond	125
Patten's lake	100
Patty's pond	100
Porter Pond	100
Ryan Prairie Pond	100
Shannon's pond	200
Steven's pond	100
Swann's ponds	300
Tucker's pond	100
Woodwards Creek	200
Magee, Nichols Branch	250
Magnolia, Big Tangipahoe Creek	100
Mantee, Mantee Lake	100
Meridian, Hunter's pond	100
Lyle's lake	100
Mountain Springs Lake	100
Warren's pond	100
White's lake	100
Mize, Mayfield's pond	100
Nathez, Stier's pond	150
Neshoba, Shockle Pond	100
Newton, Doolittle's pond	100
Okolona, Murphree's lake	200
Okolona Lake	200
Willow Pool	200
Oxford, Lafayette Springs	100
Sultan's pond	150
Pelatchee, Spann's pond	100
Pheba, Cliett's pond	400

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BREAM (SUNFISH)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Mississippi—Continued.	
Pheba, Melton's pond	100
Washington's pond	150
Philadelphia, Kings Pond	150
Pine Ridge, Pine Lake	150
Pontotoc, Pitts's pond	125
Ridgeway Lake	150
Quincy, Bird's pond	125
Quitman, Archusa Pond	100
Lake Rodgers	100
Silver Lake	100
Ripley, Martin's pond	125
Robinson's pond	125
Rucker's pond	125
Smith's pond	125
Saltillo, Saltillo Lake	300
Scooba, Cochrane and Harrington's pond	100
Eastland's pond	100
Holloway's pond	100
Senatobia, Meriwether's pond	100
Shuberta, Fewell's pond	200
Shuqualak, Anderson's pond	100
Bell Pool	200
Constantine Pond	100
Davis Pond	100
Hudson's pond	100
McNees's pond	100
Mohican Lake	100
Swan Lake	100
Starkville, Bell's lake	125
Bell's pond	125
Cyclone Dairy Pond	200
Pasture Pond	100
Reynolds's pond	200
Smith's pond	125
Suddurt's pond	100
Water Works Lake	200
Wofford's pond	125
Yeates Pond	100
Stonewall, Priester's pond	150
Sturgis, Kemp's pond	150
Tupelo, Park Lake	800
Union, Willow Pond	100
Van Vleet, Ashby's pond	125
Weir, Blaine's pond	100
Wesson, McKenney's pond	100
West Point, Fortson Lake	300
Wheeler, Hill's lake	100
Missouri:	
Bethany, Heilbrun Pond	220
Brookline, Branson's pond	150
Centralia, Boyle's pond	100
Columbia, University of Missouri	233
Independence, Cedar Lawn Lake	220
Kirksville, Normal School Pond	150
Neosho, Hickory Creek	1,000
McMahon Spring	140
Taylor's pond	250
Newberg, Little Piney Creek	3,970
Pierce City, Belt's lake	1,000
West Line, Stone's pond	220
Montana:	
Helena, Lake Hauser	300
Nebraska:	
Lorton, Evers's pond	150
New Jersey:	
Bridgeton, Cohansey Creek	200
Jersey City, Cirrito's pond	200
New Mexico:	
Artesia, Hodges's reservoir	100
Cloudcroft, Lucas's lake	50
Corona, Pop's pond	150
Taiban, Bates's pond	100
New York:	
Katona, Grafran Farm Pond	200
Mount Kisco, Fairview Pond	200

Disposition.	Fingerlings, yearlings, and adults.
North Carolina:	
Auburn, Powell's pond	75
Brevard, King John Lake	100
Catawba, Branch Pond	75
Crutchfield, Stanley's mill pond	75
Glen Alpine, Silver Creek Branch	75
Goldsboro, Slaughter's pond	100
Graham, Haw Creek	100
Hendersonville, Lake Osceola	125
Kernersville, Clear Creek	75
Poplar, Poplar Creek	200
Raleigh, Spring Lake	75
Salisbury, Dutch Second Creek	100
Earnhardt's pond	100
North Dakota:	
Dunseith, Carlie Pond	150
Hebron, Spring Lake	150
New Salem, Clear Lake	150
St. John, Jarvis Lake	150
Ohio:	
Bryan, Wasp Lake	50
Chardon, Bass Lake	100
Cincinnati, Burnet Woods Lake	200
Cumminsville, Work House Lake	200
Gibsonburg, Stone Quarry Pond	50
Gilbert, Tacras Pond	120
Kent, Cuyahoga River	150
McCutchenville, Spring Lake	100
Sharon, Spring Pond	200
Smithfield, Welday's pond	200
South Brooklyn, Buhl's pond	100
St. Clairsville, Porterfield Pond	100
Tiffin, Pennington Pond	150
Tippecanoe City, Kessler Pond	120
Youngstown, Cohassett and Glazier lakes	135
Oklahoma:	
Alva, Hyde's pond	150
Ardmore, Power Company reservoir	300
Rod and Gun Club Lake	100
Dustin, Spring Pond	100
Sparks, Oak Dale Farm Ponds	150
Sulphur, Sulphur Creek	300
Tyrone, Clutter's pond	150
Pennsylvania:	
Chester, Ridley Creek	200
Noble, Hering's pond	300
Ralston, Mansuy's pond	100
Scranton, Cobb Pond	300
South Carolina:	
Abbeville, Calhoun Creek	50
Curitail Creek	200
Aiken, Bridge Creek	50
Anderson, Sweetwater Springs Lake	150
Beaufort, Phosphate Company's pond	200
Bradley, Hard Labor Creek	50
Central, Madden Branch	150
Conway, Smith's mill creek	200
Cowpens, Thicketty Creek Pond	200
Drayton, Magnolia Gardens Pond	50
Edgefield, Fields Branch Pond	50
Gary, Singley Pond	200
Greenwood, Grendel Mills Pond	150
Johns Creek	50
Greer, Clear Branch Pond	150
Jefferson, Braswell Branch Pond	50
Kershaw, Mill Pond	50
Lugoff, Cooks Run	50
Ninety Six, Ninety Six Mill Pond	50
Newberry, Brickyard Pond	50
Old Town, Fellers Lake	50
Sanders's lake	50
Orangeburg, Willowdale Pond	200
Piedmont, Grove Pond	200
Hurricane Creek	200
Pomaria, Bethel Pond	50
Cromer's pond	50

Details of Distribution of Fish and Fish Eggs—Continued.

BREAM (SUNFISH)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
South Carolina—Continued.	
Pomaria, Daisy Dell Pond	100
Enterprise Pond	100
Long Pond	50
Railroad Pond	50
Sand Pond	50
Setzler's lake	50
Slike Pond	50
Prosperity, Cook's pond	50
Witte Pond	50
Seneca, Crow's pond	150
Pickett's pond	150
Simpsonville, Wood's pond	100
Sumter, Brickyard Ponds	50
Trenton, Clearwater Pond	50
Walhalla, Spring Branch Pond	300
Westminster Lyles Creek Mill Pond	150
Williamston, Bowie's pond	350
Willington, Kennedy's pond	50
South Dakota:	
Armour, Lake Andes	125
Belle Fourche, Red Water River	250
Bruce, Oakwood Lake	125
Freeman, Lake Spitzberger	200
Lesterville, Peska Lake	175
Mitchell, James River	250
Parkston, James River	250
Spencer, Kruse's pond	50
Watertown, Kampeska Lake	250
Tennessee:	
Allens Creek, Morrison's pond	100
Bailey, Davis Gin Pond	125
Belvidere, Warmbrod's pond	100
Bolivar, Wood's pond	150
Brace, Buffalo Creek Pond	100
Cleveland, Silver Lake	150
Columbia, Brown's pond	100
Davis's pond	100
Primm's pond	100
Dickson, Pardue's pond	200
Greenwood, Maple Ponds	100
Hartsville, Blue Grass Pond	150
Johnson City, Rose Hill Pond	150
Johnson Stand, Sells's lake	150
Jonesboro, Ball's pond	125
Lebanon, Bethany Pond	150
Horseshoe Pond	150
McMinnville, Collins River	100
Madisonville, Carson Pond	200
Medon, Rochelle's pond	200
Nashville, Morgan's pond	125
Newbern, Lily Pond	125
Rock Island, Cope's pond	200
Rogers Springs, Rogers Springs Lake	250
Saulsbury, Wrights Pond	250
Sequatchie, Little Sequatchie River	150
Somerville, Wetzler's pond	125
Springfield, Rawls's pond	150
Vasper, Pebley's pond	200
Westmoreland, Trammel Pond	150
Wildersville, Wilson's pond	125
Texas:	
Austin, Austin Lake	425
Avery, Bradens Spring Pond	15
Benjamin, Mitchell's pond	250
Big Sandy, Lake Everman	400
Blossom, Hill's pond	100
Bonham, McClure's pond	100
Bronson, Willow Lake	65
Brownwood, Hutchinson's pond	50
Watts's pond	50
Wills Creek	50
Childress, Fish's pond	100
Colorado, Hagler's pond	200

Disposition.	Fingerlings, yearlings, and adults.
Texas—Continued.	
Comstock, Yates's pond	50
Corsicana, Corsicana Fish Association Pond	200
Refinery Company's Pond	100
Eagle Pass, Bibiro Lake	40
Garrison, Attoyac Creek	150
Gatesville, Brown's pond	50
Grandview, McFarland's pond	200
Hallettsville, Houchins's pond	50
Hutchins, Vining Lake	200
Karnes City, Karnes Reservoir	30
Kaufman, Blunkenship's pond	75
Lampasas, Collins's pond	30
Laredo, Sanchez and Johnson's ponds	100
Little River, McFarland's pond	50
McKinney, Hunting and Fishing Club Lake	300
Mabank, Stillwater Pond	75
Malakoff, Airhart Lake	200
Daniels Lake	200
Stephens Lake	300
Marathon, Roccilla Springs	50
Monahans, Monahans Pond	50
Mount Calm, Cates's pond	30
Mount Selman, Sanderson's lake	100
Nacogdoches, Fern Lake	300
Naples, Sanford's pond	90
Olive, Thomas's pond	150
Pecos, Springer's pond	50
Pettus, Page's reservoir	50
Plainview, Dunlap's pond	70
Quanah, Lake Damsite	200
Rockwall, Lofland's pond	100
San Angelo, Bailey's lake	30
San Antonio, Giles's lake	30
Wilkins's lake	100
San Marcos, Rebecke Creek	100
Sherman, County Club Lake	50
Tenaha, Cliff Lake	300
Texarkana, Boston Road Water Works Lake	25
Ohio Spring Lake	25
Timpson, Myrtle Head Pond	50
Tyler, Lakewood Club Lake	200
Virginia:	
Ballsville, McLaurin's pond	100
Barboursville, Jennings's pond	100
Disputanta, Disputanta Pond	125
De Witt, Stevens Run Pond	100
Freeport, Farinholt's pond	125
McGaheysville, Pondview Pond	100
Newsoms, Cypress Pond	125
Scottsville, Bragg's pond	200
Washington:	
Colville, Lake View	200
Seattle, Wildcat Lake	300
West Virginia:	
Cove Run, Sandy Creek	75
Falling Waters, Emerson's pond	100
Wisconsin:	
Birchwood, Birch Lake	650
Chetoc Lake	400
Knox Lake	300
Little Bass Lake	300
Cable, Henry Lake	300
Rosi Lake	250
Genoa, Mississippi River	1,050
La Crosse, Mississippi River	10,300
Prairie du Chien, Mississippi River	23,100
Pulaski, St. Bonaventure Pond	150
Total [a]	317,888

[a] Lost in transit, 6,975 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

PIKE PERCH.

Disposition.	Eggs.	Fry.
Illinois:		
Dallas City, Mississippi River		800,000
Fox Lake, Kleins lake		400,000
Havana, Illinois Fish Commission	25,000,000	
Lake Forest, Armours lake		400,000
Meredosia, Illinois River		1,000,000
Meredosia Bay		2,100,000
Indiana:		
Angola, Crooked Lake		400,000
Fox Lake		200,000
Lake Gage		200,000
Ligonier, Diamond Lake		200,000
Monticello, Tippecanoe River		300,000
Pierceton, Barbee Lake		200,000
Winona Lake, Winona Lake		200,000
Iowa:		300,000
Chariton, "Q" Lake		
Chester, Upper Iowa		300,000
Syracuse, Boydston River		700,000
Manchester, Maquoketa River		50,000
Waterloo, Cedar River		200,000
Kansas:		
Marion, Cottonwood River		200,000
Kentucky:		
Cadiz, Little River		300,000
Valley View, Tates Creek		300,000
Maryland:		
Hancock, Potomac River		1,000,000
Massachusetts:		
Berkshire County, Plantain Pond		200,000
Falmouth, Spectacle Pond		300,000
Pittsfield, Pontoosuc Lake		400,000
Waltham, Hardy pond		200,000
Michigan:		
Algonac, St. Clair River		2,500,000
Bay City, Saginaw Bay		9,250,000
Crystal Falls, Dollar Lake		800,000
Detroit, Detroit River		30,000,000
Michigan Fish Commission	50,000,000	
Osseo, Bird Lake		300,000
Paw Paw, Maple Lake		300,000
St. James, Beaver Harbor		300,000
Tecumseh, Red Pond		300,000
Vassar, Cass River		400,000
Minnesota:		
Alexander, Lake Carlos		200,000
Lake Latoka		200,000
Lake Mary		200,000
Union Lake		200,000
Carlton, Chub Lake		300,000
Chisago City, Green Lake		500,000
Elbow Lake, Tenmile Lake		200,000
Smiley, Pelican Lake		500,000
Sturgeon Lake, Sturgeon Lake		300,000
Twig, Turtle Lake		300,000
New Hampshire:		
Canobie, Canobie Lake		400,000
Centre Ossipee, Ossipee Lake		500,000
New Hampshire—Cont'd.		
Cheshire County, Connecticut River		500,000
Claremont, Crescent Lake		400,000
Fitzwilliam Depot, Laurel Lake		200,000
New Jersey:		
Pompton Lakes, Pompton Lake		500,000
New York:		
Batavia, Tonawanda Creek		800,000
Battery Park, New York Aquarium	1,000,000	
Bliss, Eagle Lake		600,000
Bloomingburgh, Shawaugunk Kill Creek		300,000
Cape Vincent, St. Lawrence River		3,500,000
Gouverneur, Oswegatchie River		800,000
Sea Breeze, Irondequoit Bay		600,000
Shushan, Lake Lauderdale		400,000
Walden, Wall Kill River		800,000
North Dakota:		
Burnstad, Beaver Lake		400,000
Harvey, Sheyenne River Reservoir		300,000
Jamestown, Spiritwood Lake		500,000
Lisbon, Sheyenne River		1,000,000
Ray, Cottonwood Lake		300,000
McLeod Lake		300,000
Ruso, Camp Lake		300,000
St. John, Belle Lake		100,000
Blose's lake		100,000
Clear Lake		100,000
Crow Lake		100,000
Dion Lake		100,000
Forest Lake		100,000
Grass Lake		100,000
Island Lake		100,000
Kings Lake		100,000
Lake Upsilon		200,000
Long Lake		100,000
Mill Lake		100,000
Round Lake		100,000
Walkers lake		100,000
Turtle Lake, Lake Margaret		300,000
Ohio:		
Columbus, Scioto River		500,000
Kelleys Island, Lake Erie		30,000,000
Napoleon, Maumee River		800,000
North Bass Island, Lake Erie		15,000,000
Port Clinton, Lake Erie		17,750,000
Put-in Bay, Lake Erie		15,000,000
Ohio Fish Commission	158,725,000	
Pennsylvania:		
Beavertown, Middle Creek		600,000
Bedford, Dunning Creek		400,000
Raystown Branch		500,000
Bushkill, Lehman Lake		300,000
Cherry Tree, Susquehanna River		250,000
Erie, Pennsylvania Fish Commission	223,125,000	
Factoryville, Lake Sheridan		300,000
Heart Lake, Heart Lake		600,000
Hickory, Allegheny River		750,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

PIKE PERCH—Continued.

Disposition.	Eggs.	Fry.
Pennsylvania—Continued.		
Lenape, Brandywine Creek		250,000
Manheim, Chiquesatunga Creek		250,000
Masten, Loyalsoek Creek		400,000
Milan, Chemung River		400,000
Susquehanna River		400,000
Mount Wolf, Susquehanna River		200,000
Pittston, Bear Lake		300,000
Tehoma Pond		300,000
Port Royal, Tuscarora Creek		250,000
Rowland, Lackawaxen River		300,000
Saxton, Rose Lawn Braneh		500,000
Susquehanna, Page Pond		200,000
Susquehanna River		500,000
Troy, Mountain Lake		600,000
Warren, Allegheny River		750,000
Winfield, Penn Creek		900,000
Tuscarora Creek		300,000
Wrightsville, Susquehanna River		300,000
York, Conewago Creek		200,000
York Haven, Conewago Creek		200,000
Susquehanna River		400,000
South Dakota:		
Estelline, Lake Poinsett		400,000
Madison, Lake Madison		500,000
Roberts County, Lake Traverse		600,000
Vermont:		
Brandon, Lake Hortonia		400,000
Coneord, Halls pond		200,000
Hyde Park, Lake Eden		400,000
Miles Pond, Miles pond		400,000
Rutland, Lake Bomoseen		500,000
Swanton, Misssiquoi Bay		2,175,000
Missisquoi River		6,425,000
Virginia:		
Basic City, South River		500,000
Dryden, Powell River		500,000
Mount Jaekson, Shenandoah River		400,000
Pembroke, Mountain Lake		200,000
Woodstock, Shenandoah River, North Fork		400,000
West Virginia:		
Buekhannon, Buckhannon River		300,000
Philippi, Buckhannon River		300,000
Romney, Potomac River, South Fork		800,000
Wellsburg, Ohio River		400,000
Wiseonsin:		
Alma Center, Hatfield Dam		300,000
Cable, Namekagon Lake		500,000
Colgate, Lake Five		200,000
Cumberland, Vermilion Lake		500,000
Eagle River, Nelson Lake		400,000
Glenbeulah, Crystal Lake		300,000
Gordon, Big Sand Lake		700,000
Bond Lake		500,000
Middle Lake		150,000
Railroad Lake		150,000
Whitefish Lake		200,000
Harshaw, Riee Lake		300,000
Hatfield, Lake Arbutus		300,000
Independence, Bugle Lake		300,000
Pelican, Pelican Lake		800,000
Roosevelt, Clear Lake		300,000
Mud Lake		300,000
North Pelican		600,000
Pelican Lake		600,000
Solon Springs, Lake St. Croix		200,000
Superior, Dowling Lake		200,000
Total[a]	457,850,000	187,050,000

[a] Lost in transit, 500,000 fry.

YELLOW PERCH.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
California:			
Fresno, Kings River			80
Lake County, California Fish Commission, Clear Lake			80
Los Angeles, California Fish Commission, Russell Lake			80
Water Company pond			80
Saeramento, California Fish Commission, Sutterville Lake			40
Washington Lake			40
Tehachapi, Clark Lake			40
Connecticut:			
Danbury, Weekapeeka Lake			100
Windsor Locks, Connecticut Fish and Game Commission	10,000,000		
Idaho:			
Orchard, Indian Creek Reservoir			300
Indiana:			
Mineral City, Plummer Creek			200
Mooresville, Hadley's pond			100
Shelbyville, Little's pond			100

Details of Distribution of Fish and Fish Eggs—Continued.

YELLOW PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Iowa:			
North McGregor, Mississippi River			24,700
Kansas:			
Larned, Lake View			100
Kentucky:			
Fredonia, Harper's pond			150
Munfordville, Moppins Pond			150
Mount Sterling, Gatewood's pond			100
Maryland:			
Accokeek Creek, mouth, Potomac River		31,409,000	
Baltimore, Treadwell Pond			75
Broad Creek, mouth, Potomac River		5,743,000	
Bush River Station, Bush River		2,500,000	
Chesapeake City, Bohemia River		2,000,000	
Dorsey Lane Station, Patapsco River		400,000	
Gaithersburg, Noyes Lake			48
Great Falls, Potomac River			250
Havre de Grace, Chesapeake Bay		40,600,000	
Susquehanna River		2,000,000	
Swan Creek		1,243,000	
Hoods Mill, Patapsco River		800,000	
Lambson, Sassafras River		800,000	
North East, North East River		5,000,000	
Piscataway Creek, mouth, Potomac River		26,821,935	
Pocomoke City, Pocomoke River		800,000	
Pamunkey Creek, mouth, Potomac River		8,323,925	
Princess Anne, Manokin River		500,000	
Town Point, Bohemia River		3,000,000	
Elk River		6,000,000	
Massachusetts:			
Holyoke, Smith Pond		441,600	
Springfield, Turner Park Pond		441,600	
Missouri:			
Independence, Cedar Lawn Lake			150
New Jersey:			
Old Bridge, South River			800
Red Bank, Somerset Pond		300,000	
New Mexico:			
Tularosa, Lametos Springs			100
New York:			
Batavia, Godfreys Pond		50,000	
Tonawanda Creek		150,000	
Cambridge, Crystal Lake			100
Dead Pond			100
Schoolhouse Lake			100
Middletown, Wallkill River		500,000	
Walden, Wallkill River		1,000,000	
North Carolina:			
Cliffs, Cliffs Pond			100
Littleton, Johnsons Mill Pond			100
Mayodan, Daniel's pond			100
Salisbury, Crane Creek			100
Cooleemee Pond			100
Grant Creek			100
Second Creek			200
North Dakota:			
Cayuga, Lake Tewankon			300
Devils Lake, Devils Lake			650
Ellendale, Jim Lake			150
St. John, Jarvis Lake			150
Sykeston, Lake Hiawatha			150
Ohio:			
Cuyahoga Falls, Crystal Lake			300
Put-in Bay, Lake Erie		10,000,000	
Pennsylvania:			
Dushore, Little Loyalsock Creek			125
Factoryville, Card Pond		100,000	
Shibley Pond		100,000	
Greenville, Shenango River			125
Hallstead, Susquehanna River			140
Lancaster, Conestoga Creek		800,000	
Lenape, Brandywine Creek		500,000	
Noble, Hering's pond		300,000	
Rising Springs, Sinking Creek			250
Sandy Lake, Plum Lake			200
Stillwater, Grove Ponds			100
Tyrone, Elkhurst Lake			150
Waltersburg, Big Redstone Creek			300
Winfield, Penn Creek		100,000	

Details of Distribution of Fish and Fish Eggs—Continued.

YELLOW PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
South Carolina:			
Anderson, Spring Lake			100
Troy, Langley's pond			100
South Dakota:			
Wentworth, Brant Lake			100
Tennessee:			
Somerville, Leach's pond			120
Vermont:			
Passumpsic, Passumpsic River		300,000	
Whitingham, Laurel Lake		441,600	
Virginia:			
Basic City, Factory Spring			150
Jordan Springs		200,000	
Craney Island, Potomac River		7,020,000	
Disputanta, Wyche Pond			100
Dogue Creek, mouth, Potomac River		19,147,100	
Front Royal, Greenfield Run		400,000	
Little Hunting Creek, mouth, Potomac River		16,135,950	
Manassas, Ransdell's pond			100
Mount Jackson, Mill Creek		1,000,000	
Paeonian Springs, Catoctin Creek		700,000	
Pohick Creek, Potomac River		15,341,700	
Somerset, Gravis's pond		200,000	
Washington:			
Machias, Lake Menzies			200
Wisconsin:			
Independence, Bugle Lake			200
Prairie du Chien, Mississippi River			17,300
Wyoming:			
Sheridan, Lake De Smet			300
Total[a]	10,000,000	213,610,410	50,873

STRIPED BASS.

North Carolina:			
Weldon, Roanoke River		4,518,000	

WHITE PERCH.

Connecticut:			
Deep River, Connecticut Fish Commission	5,000,000		
East Hampton, Pocotopang Lake		800,000	
Delaware:			
Wilmington, Delaware River		4,500,000	
District of Columbia:			
Twining City, Anacostia River		2,500,000	
Georgia:			
Oak Park, Ohoopee River		4,000.000	
Maryland:			
Baltimore, Maryland Fish Commission	2,000,000		
Bush River Station, Bush River		4,000,000	
Charleston, North East River		8,100,000	
Chesapeake City, Bohemia River		6,000,000	
Earlville, Captain John Creek		5,000,000	
Great Falls, Potomac River			2,650
Havre de Grace, Chesapeake Bay		158,960,000	
Susquehanna River		12,000,000	
Swan Creek		29,000,000	
Lambson, Sassafras River		1,200,000	
Magnolia, Gunpowder River		4,000,000	
North East, North East River		7,000,000	
Pocomoke, Wogram Pond		600,000	
Queen Anne, Tuckahoe River		1,200,000	
Spesutie Island, Chesapeake Bay		16,000,000	
Town Point, Elk River		45,500,000	
Massachusetts:			
Baldwinville, Lake Dennison		800,000	
East Pappoose, Nissitisset River		400,000	
Fitchburg, Wachusetts Lake		800,000	
Haverhill, Lake Saltonstall		400,000	

[a] Lost in transit, 2,127 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

WHITE PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Massachusetts—Continued.			
Leominster, Fort Pond		600,000	
Spectacle Pond		600,000	
Medfield, Mine Pond		400,000	
Millbury, Dorothy Pond		600,000	
Templeton, Hadley Mill Pond		600,000	
Ware, Hardwick Lake		800,000	
New Hampshire:			
Nashua, Silver Lake		400,000	
Weirs, Long Pond		600,000	
New York:			
Battery Park, New York Aquarium	5,150,000		
Cold Spring, New York Forest, Fish, and Game Commission	12,350,000		
Fallsburg, Pleasure Lake		1,000,000	
Vermont:			
Walden, Coles Pond		400,000	
Total	24,500,000	318,760,000	2,650

YELLOW BASS.

Disposition.	Fry.	Fingerlings, yearlings, and adults.	Disposition.	Fry.	Fingerlings, yearlings, and adults.
Arkansas:			Mississippi—Continued.		
Des Arc, Des Arc Bayou	136,938		Ripley, Robinson's pond		50
Mississippi:			Shuqualak, Anderson's pond		75
Aberdeen, Horseshoe Lake		75	Cole Pond		75
Baldwyn, Yeager's pond		100	Tupelo, Tupelo Park Pond		300
Ecru, Maple Lake		50	Van Vleet, Gray's pond		100
Houston, Buchanan Pond		75	Wheelers, Bennett's lake		100
Gray Pond		75			
Moffit Pond		75	Total	136,938	1,225
Smith's pond		75			

SMELT.

Disposition.	Eggs.	Fry.	Disposition.	Eggs.	Fry.
Maine:			New York—Continued.		
Otis, Green Lake		9,400,000	Raquette Lake, Sagamore Lake	1,100,000	
Michigan:					
Sault Ste. Marie, Michigan Fish Commission	22,500,000		Total	24,700,000	9,400,000
New York:					
Raquette Lake, Mohegan Lake	1,100,000				

FRESH-WATER DRUM.

Disposition.	Fingerlings, yearlings, and adults.
Iowa:	
North McGregor, Mississippi River	12,500
Wisconsin:	
Prairie du Chien, Mississippi River	12,500
Total	25,000

Details of Distribution of Fish and Fish Eggs—Continued.

COD.

Disposition.	Fry.	Disposition.	Fry.
Maine:		Massachusetts—Continued.	
Boothbay Harbor, Boothbay Harbor	8,957,000	Lackeys Bay, Lackeys Bay	503,000
Cape Elizabeth, Atlantic Ocean	308,000	Vineyard Sound	979,000
Pemaquid, Johns Bay	237,000	Manchester, Massachusetts Bay	11,480,000
Southport, Ebencook Harbor	803,000	Marblehead, Massachusetts Bay	4,620,000
Massachusetts:		Rockport, Atlantic Ocean	9,550,000
Beverly, Massachusetts Bay	36,120,000	Tarpaulin Cove Light, Vineyard Sound	4,709,000
Bird Island, Buzzards Bay	2,599,000	Waquoit, Waquoit Bay	2,087,000
Bourne, Buzzards Bay	1,924,000	Weepecket Island, Buzzards Bay	1,085,000
Gloucester, Atlantic Ocean	12,830,000	Woods Hole, Great Harbor	395,000
Massachusetts Bay	5,700,000	Eel Pond	787,000
Gosnold, Buzzards Bay	8,896,000		
Vineyard Sound	37,653,000		
Great Harbor, Vineyard Sound	1,314,000	Total	153,536,000

FLATFISH.

Maine:		Massachusetts—Continued.	
Boothbay Harbor, Boothbay Harbor	117,924,000	Mattapoisett Harbor, Buzzards Bay	17,437,000
Mill Cove	5,799,000	Monument Beach, Phinneys Harbor	16,953,000
Townsend Gut	15,572,000	North Falmouth, North Falmouth Harbor	8,808,000
Cape Elizabeth, Atlantic Ocean	5,612,000	Pine Point, Wareham River	13,882,000
Five Islands, Five Isle Harbor	18,754,000	Quissett, Quissett Harbor	20,340,000
Pemaquid, Johns Bay	6,937,000	Ram Island, Great Harbor	9,301,000
Southport, Ebencook Harbor	5,798,000	Rockport, Atlantic Ocean	19,340,000
Townsend Gut	5,674,000	Rockport Harbor	20,930,000
Massachusetts:		Tarpaulin Cove, Vineyard Sound	61,132,000
Beverly, Beverly Cove	7,860,000	Vineyard Haven, Vineyard Haven Harbor	6,720,000
Massachusetts Bay	27,540,000	Waquoit, Waquoit Bay	26,074,000
Falmouth, Falmouth Harbor	1,437,000	Wareham, Wareham River	8,040,000
Falmouth Heights, Vineyard Sound	11,598,000	West Falmouth, West Falmouth Harbor	9,400,000
Gloucester, Gloucester Harbor	96,280,000	Woods Hole, Eel Pond	14,324,000
Ipswich Bay	7,450,000	Great Harbor	11,375,000
Great Harbor, head, Great Harbor Bay	7,063,000	Rhode Island:	
Greens Pond, Nantucket Sound	7,503,000	Brentons Cove, Narragansett Bay	6,333,000
Hadley Harbor, Hadley Harbor	40,756,000	East Greenwich, East Greenwich Bay	18,052,000
Kettle Cove, Buzzards Bay	12,055,000		
Lackeys Bay, Lackeys Bay	36,467,000		
Lackeys Bay, head, Vineyard Sound	8,722,000		
Lamberts Cove, Lamberts Cove	12,694,000		
Manchester, Massachusetts Bay	38,690,000	Total	786,626,000

POLLACK.

Massachusetts.		Massachusetts—Continued.	
Beverly, Massachusetts Bay	3,650,000	Rockport, Atlantic Ocean	17,090,000
Gloucester, Atlantic Ocean	9,390,000		
Manchester, Massachusetts Bay	760,000	Total	30,890,000

LOBSTER.

Maine:		Maine—Continued.	
Biddeford, Biddeford Pool	2,000,000	Georgetown, Fine Isle Harbor	500,000
Boothbay Harbor, Boothbay Harbor	11,856,000	Herman Harbor	500,000
Linekins Bay	1,000,000	Gouldsborough, Prospect Harbor	500,000
Mill Cove	7,500,000	Isle of Shoals, Isle of Shoals Harbor	3,000,000
Bristol, Johns Bay	10,500,000	Isleford, Cranberry Isle Harbor	500,000
Brooklin, Center Harbor	1,000,000	Jonesport, Cape Split Harbor	500,000
Cape Porpoise, Cape Porpoise Harbor	2,000,000	Moose Peak Reach	2,000,000
Corea, Indian Harbor	1,000,000	Rogue Thoroughfare	200,000
Cutler, Cutler Harbor	500,000	Kennebunk Port, Kennebunk Port Harbor	3,000,000
Lakemans Harbor	100,000	Kittery, Pepperell Cove	3,000,000
Deer Isle, Penobscot Bay	1,500,000	Atlantic Ocean	2,000,000
Eastport, Broad Cove	4,000,000	Lawry, Delanos Cove	2,000,000
East Boothbay, Linekins Bay	1,000,000	Little Deer Isle, Penobscot Bay	1,000,000
East Steeben, Dyers Bay	500,000	Lubec, Johnsons Bay	2,000,000
Friendship, Friendship Harbor	3,000,000	Machias, Lakemans Harbor	1,500,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LOBSTER—Continued.

Disposition.	Fry.
Maine—Continued.	
Matinicus, Matinicus Harbor	3,000,000
North Harbor	3,000,000
Monhegan, Monhegan Harbor	3,000,000
Mount Desert, Bass Harbor	1,000,000
South West Harbor	1,500,000
Naskeag, Naskeag Harbor	500,000
North Haven, Browns Cove	50,000
Fox Isle Thoroughfare	500,000
Portland, Portland Harbor	4,000,000
Rockland, Rockland Harbor	7,321,000
Southport, Boothbay Harbor	1,000,000
Ebencook Harbor	3,500,000
Pig Cove	1,500,000
Townsend Gut	800,000
South Addison, Cape Split Harbor	50,000
South Hancock, Skillings River	3,000,000
South Stebbin, Atlantic Ocean	600,000
St. George, Matinic Harbor	3,000,000
Stonington, Deer Isle Thoroughfare	1,000,000
Swan Isle, Mackerel Cove	500,000
Vinal Haven, Carvers Harbor	3,000,000
Wells, Wells Bay	3,000,000
West Boothbay Harbor, West Boothbay Harbor	778,000
Winter Harbor, Bunker Harbor	3,000,000
Sand Cove	500,000
York, York Harbor	3,000,000
Massachusetts:	
Beverly, Massachusetts Bay	700,000
Boston, Boston Harbor	2,978,000
Gloucester, Atlantic Ocean	1,970,000
Ipswich Bay	480,000
Massachusetts—Continued.	
Gloucester, Massachusetts Bay	500,000
Gosnold, Buzzards Bay	735,000
Vineyard Sound	1,301,000
Hadley Harbor, Hadley Harbor	1,687,000
Manchester, Massachusetts Bay	540,000
Marblehead, Massachusetts Bay	400,000
Menemsha Bight, Vineyard Sound	692,000
Nahant, Massachusetts Bay	1,800,000
Nobska Point, Vineyard Sound	2,159,000
Pasque Island, Buzzards Bay	883,000
Penikese Island, Buzzards Bay	1,245,000
Provincetown, Provincetown Harbor	1,184,000
Rockport, Atlantic Ocean	1,240,000
Rockport Harbor	1,350,000
Sandwich, Jones Pond	589,000
Scituate, Massachusetts Bay	800,000
Swampscott, Massachusetts Bay	560,000
Tarpaulin Cove, Vineyard Sound	2,240,000
Westport Point, Atlantic Ocean	1,800,000
Woods Hole, Great Harbor	990,000
New Hampshire:	
Hampton, Atlantic Ocean	1,300,000
Little Boars Head, Atlantic Ocean	400,000
Newcastle, Atlantic Ocean	950,000
Portsmouth, Little Harbor	8,500,000
Rye, Atlantic Ocean	1,000,000
New York:	
Fishers Island, Fishers Island Sound	1,781,000
Total	164,509,000

CONDITION AND EXTENT OF THE OYSTER BEDS OF JAMES RIVER, VIRGINIA

By H. F. Moore

Assistant, U. S. Bureau of Fisheries

Bureau of Fisheries Document No. 729

PREFACE.

On February 3, 1909, the Bureau of Fisheries received from Hon. Claude A. Swanson, governor of Virginia, a communication inclosing the following resolution of the Commissioners of Fisheries of the State:

Resolved, That the governor be requested to enlist the services of the United States Bureau of Fisheries in determining and defining the fertile and the barren areas in James River, marking and platting same, provided it can be done without expenditure by the State.

At the urgent solicitation of Governor Swanson, and upon the conviction that the work would prove of value as a guide for contemplated legislation by the State in respect to the future administration of the public oyster grounds, the request for the survey was acceded to, the steamer *Fish Hawk* and civilian assistants were detailed for the work, and Dr. H. F. Moore, assistant in the Bureau of Fisheries, was directed to assume charge.

The erection of signals was begun early in July and completed by August 7. The actual examination of the oyster beds commenced on August 9 and extended, with only such interruptions as were due to the weather, to September 14, the survey thus covering the period just prior to the opening of the oyster season, when the beds were in their optimum condition. Under the terms of the resolution quoted above, the Bureau has not felt justified in offering advice as to the future treatment of the beds, and the following report is therefore confined to statements of fact and a short discussion of their several obvious avenues of application.

GEORGE M. BOWERS,
Commissioner.

UNITED STATES BUREAU OF FISHERIES,
Washington, D. C., December 1, 1909.

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CONDITION AND EXTENT OF THE OYSTER BEDS OF JAMES RIVER, VIRGINIA.

By H. F. Moore,
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PREVIOUS SURVEYS.

Prior to the investigations made by the Bureau of Fisheries in July, August, and September, 1909, two surveys of the James River oyster beds had been made, neither of which professed to delineate the rocks accurately or to furnish detailed information concerning their productiveness and condition. The first of these surveys was a reconnoissance made in 1878 by Lieut. (then Master) Francis Winslow, U. S. Navy, in command of the Coast and Geodetic Survey schooner *Palinurus*. The second was the survey of the public grounds by Mr. J. B. Baylor, assistant, Coast and Geodetic Survey, under the authority of the State, in 1892 and preceding years.

As Winslow himself states, his "examination of these beds was a very hurried one, and the delineation must be regarded as merely approximate, being the result of a hasty reconnoissance." The chart published with the report delineates merely the general outlines of the oyster-bearing areas, without attempting to show the smaller individual rocks or the density of growth, and the text is of very general character. Comparing the chart with the results of the recent survey, however, it is evident that Lieutenant Winslow's brief investigation must have shown with considerable accuracy the general distribution of oysters in the James and Nansemond rivers at that time. The differences between the general results of the two surveys are such as could be readily produced by the lapse of time and the vicissitudes through which the beds have passed under the operation of natural and human agencies. Some areas have become depleted through the intensive fishing they have sustained, or from the effects of freshets and other physical factors, while on the other hand some appear to have had their boundaries extended or have become merged with adjacent beds through the operations of the tongers.

The Baylor survey was of an entirely different character from that conducted by Winslow. It was in no sense an examination of the oyster beds themselves, but primarily and avowedly a delimitation of boundaries which included the recognized or reputed oyster-bearing bottom, as pointed out by local commissioners or representatives of each oyster-producing county. It is the writer's understanding that the county commissioners were, under the state law ordering the survey, the final arbiters with whom rested the decision whether or not a given area should be included within the boundaries of the public grounds. So far as can be learned no examinations whatever were made on the beds, the commissioners using their judgment and local knowledge in selecting the corners and the engineers with their theodolites cutting in the points indicated from stations on the shore.

Whether or not beds were omitted from the confines of the public grounds so located can not now be satisfactorily determined, owing to the development of the planting industry, outside of the Baylor lines, on all or most of the available bottom. It is evident, however, that in the region under discussion no very extensive rocks were disregarded, and a comparison of the results of the recent survey with that of 1892 shows that the Baylor lines, considered as a broad scheme of delimitation, conform closely with the general distribution of the rocks. At several places, notably on Gun and Kettle Hole rocks, parts of the natural beds undoubtedly fell outside of the lines, but the writer hazards the suggestion that this may not have been through inadvertence but because those parts of the rocks may have been already taken up as private holdings.

It has been claimed, and Mr. Baylor himself has so stated in official communications to the State, that a very considerable area of barren bottom, amounting to many thousand acres, was included within the public grounds. That this should be so, under the system adopted by the local commissioners and under the desire to assure the inclusion of all naturally productive bottom, was inevitable. Moreover, the boundaries of the beds are irregular curves, while the including surveyed boundaries must be straight lines, for purposes of administration and policing as long and unbroken as possible. To have excluded the greater part of this barren bottom would have necessitated a careful location of the natural rocks and the breaking up of the public grounds into a considerable number of small or moderate areas instead of segregating them into a few large ones.

To what extent the claim that great areas of barren bottom are included in the public grounds is justified will appear from the accompanying charts and in the following descriptions and discussions.

METHODS OF THE PRESENT SURVEY.

To furnish authoritative and definite information as to the actual extent and condition of the natural rocks and the character of the bottoms embraced within the boundaries of the public beds, it was necessary to depart widely from the methods of the previous surveys.

It was decided to confine the investigation wholly to the public beds, passing their boundaries only far enough to give assurance that the entire area had been covered. Nothing was to be gained by an examination of the excluded areas, as it is now almost impossible to determine whether natural rocks were omitted from the grounds laid out in 1892, and it is too late to correct such omissions if they could be determined. For legal purposes, all that is not avowedly public ground is barren bottom, and if held under leasehold from the State can not be alienated from the possession of the lessees as long as the law has been complied with.

The methods followed have been essentially those pursued in former surveys conducted by the Bureau of Fisheries, with the changes and improvements dictated by recent experience and the local conditions.

The Coast and Geodetic Survey furnished projections on which were platted the triangulation points used in former surveys by that bureau. Several of these points, including the light-houses, were "recovered," and from them the signals, usually tripods, erected where necessary, were cut in and platted by means of the sextant and 3-arm protractor. This method, while lacking the great precision attained by means of the best theodolites and the nice computations employed by the Coast Survey in its work, insures an accuracy more than sufficient for the purposes of an oyster survey.

The oyster beds were discovered by soundings with a lead line, but principally by means of a length of chain dragged over the bottom at the end of a copper wire running from the sounding boat. The wire was wound on a reel, and its unwound length was adjusted to the depth of water and the speed of the launch, so that the chain was always on the bottom. Whenever the chain touched a shell or an oyster the shock or vibration was transmitted up the wire to the hand of a man whose sole duty it was to give heed to such signals and report them to the recorder.

The launches from which the soundings were made were run at a speed of between 3 and 4 miles per hour, usually on ranges ashore to insure the rectitude of the lines. At intervals of three minutes—in some cases two minutes—the position of the boat was determined by two simultaneous sextant observations of the angles between a set of three signals, the middle one of which was common to the two angles, the position being immediately platted on the boat sheet. At regular intervals of twenty seconds, as measured by

a clock under the observation of the recorder, the leadsman made a sounding and reported to the recorder the depth of water and the character of the bottom, immediately after which the man at the wire reported the character of the chain indications since the last sounding—that is, whether they showed barren bottom or dense, scattering, or very scattering growths of oysters.

With the boat running at 3 miles an hour the soundings were between 80 and 90 feet apart and, as the speed of the boat was uniform, the location of each was determinable within a yard or two by dividing the platted distance between the positions determined by the sextant by the number of soundings. The chain, of course, gave a continuous indication of the character of the bottom, but the record was made at the regular twenty-second intervals observed in sounding.

The chain, while indicating the absence or the relative abundance of objects on the bottom, gives no information as to whether they are shells or oysters, nor, if the latter, their size and condition. To obtain this data it was necessary to supplement the observations already described by others more definite in respect to the desired particulars. Whenever in the opinion of the officer in charge of the sounding boat such information was required, a numbered buoy was dropped, the time and number being entered in the sounding book. Another launch, following the sounding boat, anchored alongside the buoy, and a quantity of the oysters and shells were tonged up, separated by sizes, and counted.

In former surveys made by the writer, in order to arrive at an estimate of the density of the oyster growth a definite area, usually 5 yards, was staked off by means of steel-shod pikes and everything was removed from the bottom and counted. This method is accurate, but slow and difficult in deep water, and, as it was desirable to make a large number of observations, the system developed in the Maryland survey was adopted. This consists essentially in making a known number of "grabs" with the oyster tongs, exercising care to clean the bottom of oysters as thoroughly as possible at each grab. In a given depth of water and using the same boat and tongs an oysterman will cover practically the same area of the bottom at each grab, but, other factors remaining the same, the area of the grab will decrease with an increase in the depth.

Careful measurements were made and tabulated showing the area per grab covered by the tonger employed on the work at each foot of depth of water and for each pair of tongs and boat used. With this data, and knowing the number of "grabs," the number of oysters of each size per square yard of bottom was readily obtainable by simple calculation. The following example will illustrate the data obtained and the form of the record:

DEPARTMENT OF COMMERCE AND LABOR.

BUREAU OF FISHERIES.

Field record of examinations of oyster beds.

General locality: *James River.*
Local name of oyster ground: *Between Rock wharf and Spindle rock.*
Date: *August 28, 1909.* Time: *9.25 a. m.*
Angle: *F. 140.* Buoy No.: *23.*
Depth: *7 feet.* Bottom: *Hard.*
Condition of water: *Medium clear.*
Density: ..... Temperature: .....
Current: ..... Stage of tide: .....
Tongman: *Lawrence, in flatboat.*
No. grabs made: *8.* Tongs: *14 feet.*
Total area covered: *3½ square yards*.....
No. oysters taken: { −1 in.: *27.* 1 in. −X in.: *69.*
X in. −4 in.: *10.* 4 in.: *3.*
Quantity shells: ⅓ *bushel.*
Result: { Spat per square yard: *7.7.*
Culls per square yard: *19.7.*
Counts per square yard: *3.7.*

X in.=cull limit prescribed by law.

This furnishes an exact statement of the condition of the bed at a spot which can be platted on the chart with error in position of not more than a few yards. From the data obtained a close estimate may be formed of the bushels of oysters and shells per acre in the vicinity of the examination and, by multiplying the observations, for the bed as a whole. In the course of the survey 590 observations were made at various places, principally on the natural rocks, but some on the barren bottoms also.

In former surveys by the Bureau the relative density of the oyster growth has been considered solely from the standpoint of the total quantity of oysters. That method is satisfactory where the depth is fairly uniform throughout the region examined, but was not considered accurate enough for the purposes of the present report.

With a given quantity of oysters per square yard or acre, a bed lying in shoal water is more valuable commercially than one in deep water, owing to the fact that the labor of the tonger is more efficient in the former. As has been pointed out, the area covered by a "grab" decreases with an increase in depth, and, moreover, the deeper the water the greater is the labor involved in making the "grab" and the smaller is the number of grabs which can be made per hour or per day. With 14-foot tongs used from a canoe, such as is employed

on the James River, an oysterman can cover twice as much bottom per grab in 4 feet as he can in 8 feet, and about two and one-half times as much as he can using 20-foot tongs in 16 feet. Using the tongs stated, the average tonger observed in Maryland, and the data will hold in Virginia, will make about 2.7 grabs per minute in 4 feet, 2.6 in 8 feet, and 1.8 in 16 feet of water. In other words, if he can cover 1 square yard of the bottom in a given time in 16 feet, he can cover 1.7 yards in 8 feet, and 3.3 yards in 4 feet of water.

It is obvious that if a tonger in a given time is to obtain the same quantity of oysters in each of these depths, the oyster growth must lie on the bottom with a density inversely to the areas stated above. The value of a bed, the price per bushel of the oysters being the same, depends on the quantity which a man can take in a given time, and it therefore happens that a bed in deep water may be valueless commercially, while another rock, with the same density of growth but covered by shoaler water, may be tonged with profit.

Based on these principles, and taking into consideration the number of oysters per bushel on the different beds as determined by actual counts, tables were prepared showing the number of oysters per square yard for each foot of depth necessary to yield to the tonger 1 bushel of oysters per day of tonging. From these data the beds were divided into areas, according to the number of bushels of oysters which they were capable of yielding per day to the tonger, based on nine hours of actual tonging and disregarding the time occupied in culling. The bottom was divided into 5 categories: Barren, on which there were neither shells nor oysters; depleted, on which the tonger could take less than 3 bushels of market oysters or 4 bushels of seed, according to location; very scattering growth, on which between 3 and 5 bushels of oysters or 4 and 8 bushels of seed could be taken; scattering growth, on which the limits were 5 and 8 bushels of market oysters or 8 and 12 bushels of seed; and areas of dense growth, on which upward of 8 bushels of market oysters or 12 bushels of seed could be taken per day.

During the survey 10,440 soundings were taken, and the position of the boat was instrumentally determined at 1,369 places. The chain was dragged for 226 miles, giving continuous indications of the character of the bottom, which were plotted on the chart at 10,440 places. The density of oyster growth was determined by the 590 biological observations already referred to, and the extent and boundaries of the areas as charted were fixed by a combination of these observations and the 10,440 records of the continuous chain readings. During the work the writer was in charge of the sounding boat and in constant touch with all operations. The biological observations were all under the immediate charge of Mr. T. E. B. Pope, whose

experience in such work is such as insured their accuracy both as to the area covered by the tonger and the quantity of oysters taken. The oysters brought in by the biological party were all examined by the author, who has also personally made all of the many calculations required and directly supervised the laying off of the areas on the charts. The basis for the determination of the character of the beds was decided on in advance, but the work of the survey was so planned that it was impossible for any member of the party to form an opinion as to the conditions found until after the field work was completed, and any involuntary prejudice was thus eliminated as far as possible. The author himself could form but a vague idea of the general results until the charts were completed and the report almost written.

In the following pages the subject is gradually developed from a detailed description of the several parts of the individual natural rocks to a broad consideration of the market oyster and seed areas as a whole, and in every case there is given the principal data on which the several statements are based.

OYSTER ROCKS.

The term "oyster rock," as used in Virginia and employed in this report, is synonymous with natural oyster bed and is to be distinguished from the term "public ground," which is used to designate the areas legally embraced within surveyed lines and set apart for the use of the public. The public grounds were intended to embrace all of the oyster rocks, and usually each includes a number of the latter within its confines.

An oyster rock is usually a more or less definite area of bottom, limited by the extent of actual oyster growth. Originally, the boundaries were rather definitely marked and the rocks were separated from one another by barren areas, but the operations of oystering have in many cases strewn oysters and shells over the surrounding bottom, so that in cases the original limits have become obscured and adjacent rocks merged.

On the accompanying chart much of the bottom indicated as depleted really represents the areas which have been thus covered with scattered oysters and shells, and the term employed indicates that oysters and shells are very scarce rather than that they have been removed, though the latter is the fact in many cases. The so-called "depleted" areas are those on which oysters grow in quantities much below those which would make it commercially profitable to tong for them.

The boundaries of the rocks, as shown by the red inclosing lines on the charts and as considered in the text, were defined by the

results of the chain indications, the methods of obtaining which have been before explained. All areas in which shells or oysters were encountered are regarded as rocks, but their character, so far as productiveness is concerned, was determined by tonging and counting the yield in the manner heretofore described. The depleted areas, except where it is shown that they contain a reasonably heavy growth of young, may be regarded as worthless from the viewpoint of the tonger; the areas of very scattering growth are of doubtful value except where a heavy growth of young oysters indicates potential improvement, while the areas of scattering and dense growth can be regarded as really productive natural rocks. The barren bottom, which is shown on the chart as an unshaded area outside of the red lines, is that on which neither oysters nor shells were found. A few small unshaded areas inclosed by red lines indicate beds the exact nature of which was not accurately determined.

An attempt is made in this report to designate the rocks by the names employed by the oystermen, so far as these could be ascertained. In several cases, as for instance "Fishing Point Rocks" and "Marshy Island Rock," names have been coined to serve the purposes of reference and designation. The exact extent of Point of Shoals Rock was not definitely ascertained, and as shown on the chart it may not accord with the usage of the oystermen. There was also some doubt about the location of Kettle Hole and Thomas Point Rocks, but, as the names used in the text are clearly shown on the charts, there can be no confusion in the references. In a number of cases where the several beds were more or less continuous with one another arbitrary boundaries have been adopted, but, as these usually pass through depleted areas and as in a later discussion the rocks are considered as a whole in their grouping in the public beds, the necessity for this treatment causes no loss in the final accuracy or exactitude.

In the following pages the rocks are considered in detail.

MARKET OYSTER AREA.

HOLLANDS ROCK.

This was intended to be included by the Baylor survey in Public Ground No. 3, Nansemond County, though it is stated that a mistake was made by which it was omitted. The area, 22 acres, which is described under this name included the only bottom within the public ground which gave any indication of being an oyster bed, though the examination showed it to be depleted. It is completely surrounded by planted beds.

The results of the examination were as follows:

DETAILS OF EXAMINATION OF HOLLANDS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity of oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
4	Aug. 9,1909	11.0	Depleted.....	0	0.4	1.8	3	29	32
30	Aug 11,1909	9.5	.....do.....	0	0	0	0	0	0

NANSEMOND RIDGE ROCK.

This is the principal and only productive bed in Nansemond River. It lies mainly on and about a shoal extending through the middle of the river from Cedar Point almost to the middle of James River, opposite Newport News. At its northern end it is connected, by an unproductive, practically barren area, with three smaller rocks hereafter described. Its area, density of oyster growth, and contents are as follows:

OYSTER GROWTH ON NANSEMOND RIDGE ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	85	148	93	7,905
Scattering	446	133	60	26,760
Very scattering	294	34	37	10,878
Depleted	782	35	11	8,602
Total	1,607	.....	.....	54,145

The market oysters on this bed are large, averaging at the time of the survey a few over 300 per bushel. They are said to attain a good condition, particularly late in the season, and are used mainly by shucking houses. The small oysters ran about 750 per bushel.

The broadest, largest, and most productive part of the bed stretches northward from opposite Pig Point on the west side of the channel. It is estimated that this portion has an area of about 1,156 acres, of which 69 acres bear a dense growth of market oysters, 386 acres a scattering growth, 201 acres a very scattering growth, and 500 acres are depleted. The latter does not include the barren bottom embraced between the edges of the bed and the lines of the Baylor survey. It is further estimated that on the dense bottom a man tonging exclusively could take in a day about 10 bushels of market oysters, on the scattering area about 6 bushels, on the very scattering part about 3¼ bushels, while on the depleted area he could not take an average of over 1 bushel. These estimates are for the beginning of the season,

and any considerable tonging of the beds would soon materially reduce the average catch per day.

In the dense and scattering parts of this portion of the bed, especially near the crest of the ridge, there is a growth of small oysters so dense that an average of upward of 12 bushels could be tonged per day, and these areas can undoubtedly be regarded as both presently and prospectively productive. There is also a dense growth of young oysters on the inner parts of the depleted area opposite Nansemond River Light. On the areas of very scattering growth the small oysters are in even smaller quantity than the market oysters, but in places there are clean shells in sufficient quantity to indicate that under proper conditions a good set might occur and the bottom become fairly productive.

Above a line drawn between Pig Point and Barrel Point the bed may be divided into two parts, one a tail-like continuation of the main bed running along the eastern edge of the channel and the other a detached portion lying on a shoal west of the channel, north of Larkins Rock. The former has 126 acres of depleted bottom and two small patches, one of scattering growth covering about 22 acres and the other of about 41 acres on which the oysters are very scattering. The detached area covers about 260 acres, of which 15 are dense, 39 scattering, 51 very scattering, and 155 depleted. On the areas of dense and scattering growths of market oysters there is a heavy growth of culls, but the scattering and depleted areas are generally impoverished of young.

On the two areas just described as lying above a line between Pig and Barrel points it is estimated that there are 15 acres of dense growth on which a man could tong an average of about 8 barrels of market oysters per day, 61 acres on which he could average about 5 bushels, 92 acres of very scattering growth where he could take about 4 bushels per day, and 281 acres of depleted bottom which will not yield 1 bushel per day. On the depleted area there are few young oysters and practically no shells. The barren bottom lying within this part of the Baylor survey, on which oysters do not now grow and apparently never have grown in marketable quantities, nearly equals all of the foregoing combined, covering about 430 acres. The barren and depleted bottom together aggregate about 711 acres, while all of the bottom which is capable of yielding even as little as 3 bushels per day, exclusive of the time consumed in culling, covers about 168 acres. In other words, at least 80 per cent of the area is at present commercially worthless.

The observations, in addition to the sounding and chain investigations, on which the foregoing is based, are as follows:

DETAILS OF EXAMINATION OF NANSEMOND RIDGE ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
1	Aug. 9, 1909	13.0	Dense.....	6.0	5.1	8.2	72	132	204
549	Sep. 13, 1909	6.5	.....do.....	4.7	27.7	4.7	209	76	285
582	Sept. 14, 1909	6.5	.....do.....	3.9	21.2	4.4	163	71	234
15	Aug. 10, 1909	6.0	Scattering.....	1.7	13.4	2.7	98	43	141
18	.....do.....	11.5	.....do.....	.2	.0	4.0	1	64	65
33	Aug. 12, 1909	10.5	.....do.....	.6	12.4	4.6	85	74	159
34	.....do.....	7.5	.....do.....	4.8	13.3	3.6	111	58	169
42	.....do.....	10.5	.....do.....	.2	.6	4.5	5	72	77
550	Sept. 13, 1909	6.5	.....do.....	2.3	11.6	2.3	90	37	127
576	Sept. 14, 1909	7.5	.....do.....	1.8	9.7	3.1	75	50	125
577	.....do.....	8.0	.....do.....	45.0	26.6	3.9	466	63	529
578	.....do.....	11.0	.....do.....	4.0	16.3	4.0	132	64	196
579	.....do.....	6.0	.....do.....	5.3	27.3	3.5	212	56	268
580	.....do.....	7.5	.....do.....	5.3	25.6	4.2	201	68	269
581	.....do.....	8.5	.....do.....	3.4	15.7	4.9	124	79	203
7	Aug. 9, 1909	10.0	Very scattering...	2.9	9.3	1.8	79	29	108
21	Aug. 10, 1909	9.0	.....do.....	.4	2.1	2.7	16	43	59
26	Aug. 11, 1909	8.5	.....do.....	1.6	10.9	2.8	81	45	126
35	Aug. 12, 1909	9.5	.....do.....	.9	3.8	2.2	31	35	66
39	.....do.....	10.0	.....do.....	.2	.4	2.3	4	37	41
43	.....do.....	10.5	.....do.....	.8	2.4	3.1	21	50	71
542	Sept. 13, 1909	6.0	.....do.....	.0	.8	1.4	5	23	25
2	Aug. 9, 1909	12.0	Depleted.....	.0	.0	.9	0	15	15
5	.....do.....	9.0	.....do.....	3.5	20.0	.9	153	15	168
8	.....do.....	8.0	.....do.....	8.4	23.9	.6	210	10	220
11	Aug. 10, 1909	8.5	.....do.....	1.8	13.3	.5	98	8	106
12	.....do.....	7.0	.....do.....	2.1	4.5	.9	43	14	57
13	.....do.....	7.5	.....do.....	.0	.0	.3	0	5	5
16	.....do.....	12.5	.....do.....	.0	.0	.4	0	6	6
25	Aug. 11, 1909	10.0	.....do.....	.0	.0	.0	0	0	0
36	Aug. 12, 1909.	10.5	.....do.....	.5	1.8	1.3	8	21	29
38	.....do.....	9.0	.....do.....	.7	.9	1.3	10	21	31
40	.....do.....	10.0	.....do.....	.4	.7	1.2	7	19	26
41	.....do.....	10.0	.....do.....	.7	3.5	1.9	27	31	58
547	Sept. 13, 1909	7.0	.....do.....	.2	.7	1.1	6	18	24
548	.....do.....	6.5	.....do.....	.0	.0	.2	0	3	3
551	.....do.....	7.5	.....do.....	1.3	2.9	.5	27	8	35
574	Sept. 14, 1909	9.5	.....do.....	.0	.0	.0	0	0	0
575	.....do.....	9.0	.....do.....	.0	.0	.0	0	0	0
583	.....do.....	7.0	.....do.....	2.6	10.0	1.1	82	18	100
584	.....do.....	10.5	.....do.....	.0	.0	.0	0	0	0
587	.....do.....	11.0	.....do.....	.0	.0	.0	0	0	0

LARKINS ROCK.

This is a small bed in Nansemond River at the extreme southwest corner of Public Ground No. 2. As developed by the survey it has an area of about 39 acres and a depth varying from $4\frac{1}{2}$ to 8 feet at mean low water. It is stated that the product of this bed has been in demand by shucking houses, the size and quality being generally good and the condition fat, especially early in spring. The market oysters found by the survey averaged between 300 and 350 to the bushel and the small oysters about 750 per bushel.

The bed at present bears market oysters at the average density of about 5 bushels per acre, though in spots the production is as high as 18 bushels. The young growth has an average density of about 10 bushels and a maximum of 31 bushels per acre.

At the present time this bed must be regarded as depleted, as at none of the spots examined could a man tong more than 2 bushels of oysters per day, and the average yield, taking the bed as a whole,

would be hardly more than one-half bushel per day. The young growth is sparse and the shells few. The bed bears the aspect of having been carried off bodily for planting purposes, a depredation to which its location makes it susceptible. The results of detailed examinations are as follows:

DETAILS OF EXAMINATION OF LARKINS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
20	Aug. 10, 1909	8.5	Depleted.....	0.0	0.0	0.0	0	0	0
27	Aug. 11, 1909	7.5	.....do.....	.0	.0	.0	0	0	0
28	.....do.....	6.5	.....do.....	.0	3.5	.1	23	2	25
544	Sept. 13, 1909	6.5	.....do.....	.0	.0	.0	0	0	0
545	.....do.....	7.0	.....do.....	.2	2.7	1.1	31	18	49
546	.....do.....	6.5	.....do.....	.0	.6	.6	4	10	14

DRUM SHOAL ROCK.

This is a small bed located at the northwest corner of Public Ground No. 2 in Nansemond County. Its area, density of oyster growth, and estimated contents are as follows:

OYSTER GROWTH ON DRUM SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Scattering	19	92	50	950
Very scattering	14	61	39	546
Depleted	95	62	29	2,755
Total	128	.....	.....	4,251

This bed was doubtless originally restricted to the area of the shoal which is now covered by the scattering and very scattering growth, but oysters and shells have become scattered over the surrounding bottom and it is now connected, by means of a depleted area, with Nansemond Ridge Rock on the south and Newport News Rock on the west.

The scattering growth lies in a depth of from 6 to 8 feet at mean low water and the market oysters grow in such quantity that a tonger of average ability can take about 5 bushels per day. The very scattering growth is at the eastern side of the shoal and has oysters in sufficient numbers to yield about $3\frac{1}{2}$ bushels per day. The density of growth shown for the depleted area in the table produced above is in excess of the actual conditions, as the examina-

tions on which it was based were taken in close proximity to the edge of the shoal, while the more distant bottom is more denuded. The growth of young on the productive part of the rock is fair, being sufficient to yield about 9 bushels per day on the scattered area and about 6 bushels on the very scattered area and about the edges of the shoal.

Following is the record of observations on this bed:

DETAILS OF EXAMINATION OF DRUM SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
585	Sept. 14, 1909	8.0	Scattering	2.6	11.6	3.1	92	50	142
586	do	9.0	Very scattering	1.5	7.9	2.4	61	39	100
44	Aug. 12, 1909	10.5	Depleted	.7	6.1	1.9	44	31	75
45	do	8.5	do	.9	12.0	1.7	84	27	111

NEWPORT NEWS ROCK.

This lies in the overlapping portions of Public Grounds No. 2, Nansemond County, and No. 6, Isle of Wight County, north of Nansemond Ridge, and between Drum Shoal on the east and Cruiser Rock on the west. Its estimated area, density of growth, and contents are as follows:

OYSTER GROWTH ON NEWPORT NEWS ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	4	93	108	432
Scattering	27	75	63	1,701
Very scattering	12	83	35	420
Depleted	129	34	27	3,483
Total	172			6,036

The rock in reality consists of several shoal spots separated by areas of depleted bottom in deeper water. The dense area is a small spot lying by itself in about 8 feet of water at low tide, and it bears market oysters in sufficient quantity to yield to the tonger about 9 bushels per day, and the young growth is in nearly the same quantity. The scattered and very scattered growth lies on Cruiser Shoal proper, the former being sufficiently productive to yield about 6 bushels and the latter about 3 bushels per day. On both of these areas there is a fair growth of young, sufficient to yield about 6 bushels per day.

At the eastern edge of the rock, as defined on the chart, there is a dense growth, not shown, which lies just outside of the Baylor line, and running south from this is a growth of young oysters on the so-called depleted bottom sufficient to yield about 4 bushels per day. The depleted bottom on the whole will yield about 2 bushels of market oysters per day and about the same quantity of young.

The following are the results of examinations on this rock:

DETAILS OF EXAMINATION OF NEWPORT NEWS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
52	Aug. 13, 1909	12.0	Dense	0.7	13.6	6.7	93	108	201
53	do	9.0	Scattering	1.1	9.8	4.7	71	76	147
55	do	11.0	do	1.8	10.2	3.1	78	50	128
56	do	10.0	Very scattering	1.1	11.6	2.2	83	35	118
23	Aug. 11, 1909	9.5	Depleted	3.1	5.1	1.6	53	26	79
46	Aug. 12, 1909	9.5	do	.7	4.9	1.8	36	30	66
54	Aug. 13, 1909	10.0	do	1.1	1.1	1.6	14	26	40

CRUISER SHOAL ROCK.

This rock lies on and about the shoal that gives it its name, mainly in Public Ground No. 6, Warwick County, but partly in the area common to that ground and No. 2, Nansemond County. Its area and condition are shown in the following table:

OYSTER GROWTH ON CRUISER SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	27	140	156	4,212
Scattering	19	47	53	1,007
Very scattering	26	51	28	728
Depleted	32	66	9	288
Total	104			6,235

The dense and scattered areas follow the line of a very shallow ridge which forms the backbone of the shoal, the former being capable of yielding from 10 to 20 bushels of oysters per day and the latter about 5. The area of very scattering growth lies on each side of the more prolific areas and is capable of yielding about 3 bushels of market oysters per day's tonging. The depleted area will yield an average of not over 1 bushel of market oysters per day, and the parts more distant from the ridge are practically bare. Close to the ridge, even on some of the bottom depleted of market oysters, the

growth of young is good enough to yield an average of about 15 bushels per day to the tonger; but on the very scattering and depleted areas further removed from the ridge the young growth is sparse.

The following table shows the results of the examinations made on this bed:

DETAILS OF EXAMINATION OF CRUISER SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
58	Aug. 13, 1909	10.5	Dense.....	4.0	21.0	7.3	162	117	279
589	Sept. 14, 1909	8.5	.....do.....	1.5	17.0	12.1	120	195	315
51	Aug. 12, 1909	9.0	Scattering.....	.3	7.0	3.3	47	53	100
50	.....do.....	11.0	Very scattering....	.2	.4	2.0	4	32	36
57	Aug. 13, 1909	7.5	.....do.....	1.8	13.4	1.6	99	25	124
47	Aug. 12, 1909	9.0	Depleted.....	.5	4.5	.7	32	11	43
59	Aug. 13, 1909	13.0	.....do.....	.0	.0	.0	.0	0	0
590	Sept. 14, 1909	6.0	.....do.....	5.3	20.2	.9	166	15	181

FLAT ROCK AND ADJACENT SMALL BEDS.

Flat Rock is a small bed bearing a dense growth of market oysters lying in the southeast corner of Public Ground No. 6, Warwick County. The examination of this rock was not satisfactory, as owing to an error in platting in the field certain positions supposed to be on the bed proved to be on adjacent planted beds. The single examination, in connection with traversing lines of chain readings, indicates a growth over the entire area which will yield to the tonger an average of about 9 bushels of market oysters per day. There were practically no small oysters or shells, and there was some reason to believe that the place had been planted, though it was fully 200 yards inside of the Baylor lines.

North of Flat Rock is a small depleted area, covering about 7 acres, on which there are about 26 bushels of market oysters and 16 bushels of young oysters per acre, and on which it is computed that a tonger could take not over 2 bushels of oysters per day.

West of Cruiser Rock is another unnamed bed of very scattering oysters. Its area is about 5 acres, with an average of 42 bushels of market oysters and 55 bushels of seed oysters per acre, and it is estimated that a tonger could take about $3\frac{1}{2}$ bushels of oysters per day.

Northwest of Flat Rock, at intervals of about 400 yards, are two small beds where the water does not shoal, on which no determinations were made except with the chain. The indications are of very scattering growths. The areas are about 5 and 2 acres, respectively. The data relating to the several beds examined are as follows:

DETAILS OF EXAMINATION OF FLAT ROCK AND SMALL BEDS BETWEEN NANSEMOND RIDGE AND FISHING POINT.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
31	Aug. 11, 1909	10.5	Dense	0.2	0.2	6.7	3	108	111
48	Aug. 12, 1909	10.0	Very scattering	1.8	6.7	2.6	55	42	97
32	Aug. 11, 1909	10.5	Depleted	.0	2.4	1.6	16	26	42

HIGH SHOAL ROCK.

High Shoal Rock is conspicuous from its position, near the middle of James River, surrounding a shoal of sand and broken shells bare at practically all times. The highest part of the shoal is near the channel, from which it extends shoreward toward Fishing Point. The bed, including the depleted parts, is quadrangular in shape, with its more productive areas extending at right angles to the shores along its major diameter. Its extent and density of growth are as follows:

OYSTER GROWTH ON HIGH SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	24	134	90	2,160
Scattering	13	127	48	624
Very scattering	24	58	25	600
Depleted	95	8	8½	807
Total	156			4,191

The dense area extends along practically the entire length of the shoal, as a narrow strip on both sides but especially to the eastward of the highest ridge. The market oysters are somewhat smaller than those in water a little deeper, but on the bed as a whole they were found to average about 400 to the bushel. It is estimated that on this area a tonger could take about 10 bushels of oysters per day.

The area of scattering growth forms a strip on the southern side of the bed along the edge of a deep swash channel which separates it from one of the neighboring Fishing Point Rocks. Market oysters are produced in sufficient abundance to yield the tonger about 6½ bushels per day. The very scattering area lies to the eastward of the dense area and north of the scattering, and produces oysters sufficient to furnish the tonger about 3 to 3½ bushels per day.

The depleted area, which constitutes the major portion of the bed as delineated on the chart, is principally on the western or upstream side, though a strip averaging about 100 yards in width extends around the outer end of the shoal and along its entire eastern side. This area will nowhere yield to the tonger more than about 2½ bushels of oysters per day, and the average yield of all places examined would not be over 1 bushel.

The growth of young oysters on the areas charted as dense and scattering and on the very scattering part closer to the ridge is prolific enough to yield a tonger from 8 to 25 bushels per day, the average of all places examined being about 17 bushels. Clean shells were abundant on the three productive areas and in the depleted area close to the ridge.

The data on which the foregoing statements are based is as follows:

DETAILS OF EXAMINATION OF HIGH SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
68	Aug. 13, 1909	7.0	Dense	3.6	10.9	7.8	94	94	188
70	do	7.5	do	10.0	17.0	10.3	175	125	300
473	Sept. 7, 1909	5.5	do	3.2	12.4	2.6	101	32	132
474	do	6.0	do	3.2	22.5	8.4	167	102	269
67	Aug. 13, 1909	6.0	Scattering	3.4	26.4	4.1	194	50	244
478	Sept. 8, 1909	6.0	do	2.9	6.5	3.9	61	47	108
476	do	8.0	Very scattering	.0	.3	2.9	2	35	37
477	do	3.5	do	7.6	10.1	1.3	115	16	131
63	Aug. 13, 1909	14.5	Depleted	.0	.0	.0	0	0	0
64	do	12.5	do	.0	.2	1.8	1	22	23
69	do	9.0	do	.0	.0	.0	0	0	0
71	do	7.5	do	.4	2.2	1.8	17	22	39
470	Sept. 7, 1909	4.0	do	2.4	1.8	.2	27	2	29
471	do	6.0	do	1.1	1.4	1.7	16	20	36
472	do	6.5	do	.0	1.0	1.7	6	20	26
479	Sept. 8, 1909	7.5	do	.0	.2	.0	1	0	1
480	do	9.5	do	.0	1.3	.0	8	0	8
481	do	7.0	do	.0	.0	.0	0	0	0

TROUT SHOAL ROCK.

This bed occupies the southeastern part of Naseway Shoal. In its depleted area it is continuous with Dog Shoal Rock, which occupies the upper part of the same shoal, but is separated from the adjacent Fishing Point and High Shoal Rocks by swash channels in which there is an abrupt deepening of the water. The depth ranges from low-water mark to 10 or 11 feet, the greater depths being found in a pocket of deep water which extends far into Naseway Shoal from the westward.

The extent and productiveness of the bed are shown in the following table:

OYSTER GROWTH ON TROUT SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Scattering	25	165	44	1,100
Very scattering	14	118	30	420
Depleted	90	21	8	720
Total	129			2,240

There is no dense growth within the meaning of the definition adopted in this report—that is, bottom on which 8 or more bushels of market oysters may be tonged by a man working 9 hours. There are two areas of scattering growth which lie as strips along the line of a shoal largely exposed at low water. These areas are sufficiently productive to yield from 5 to 10 bushels of market oysters per day to the tonger, the average being about 7 bushels.

The only other productive bottom is a very scattering area occupying the central and eastern portion of the rock, from the ridge to the deep water lying between this shoal and High Shoal. On this area a tonger can average a little over 3 bushels of oysters per day. Depleted areas lie on each side of the shoal, that on the western side being more extensive and continuous with the depleted area of Dog Shoal rock. On these areas a tonger could take hardly a bushel of market oysters per day, although there are spots a little more productive. On the scattering and very scattering areas of market oysters the young growth is prolific, on the former being sufficient to yield to the tonger an average of about 26 bushels per day and on the latter about 16 bushels. On both of these areas there is an abundance of clean shells suitable for taking a set of spat, but the depleted areas have comparatively few shells and young oysters.

The following observations were made on this rock:

DETAILS OF EXAMINATION OF TROUT SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
76	Aug. 13, 1909	6.5	Scattering	7.7	32.3	4.0	260	48	308
105	Aug. 14, 1909	4.0	do	1.0	16.1	2.4	111	29	140
482	Sept. 8, 1909	4.5	do	4.7	29.1	4.9	220	59	279
488	do	6.5	do	4.2	21.6	3.4	168	41	209
75	Aug. 13, 1909	6.0	Very scattering	4.3	18.3	2.0	147	24	171
106	Aug. 14, 1909	5.0	do	.8	25.6	1.8	171	22	193
107	do	10.0	do	.4	18.7	3.3	124	40	164
108	do	9.5	do	.0	4.8	2.8	31	34	65
72	Aug. 13, 1909	11.5	Depleted	.4	2.1	1.7	16	21	37
483	Sept. 8, 1909	11.0	do	.7	2.3	.3	19	4	23
484	do	5.5	do	1.6	6.1	.6	50	7	57
487	do	6.5	do	.0	.0	.0	0	0	0

DOG SHOAL ROCK.

This bed occupies the northwestern or upstream part of Naseway Shoal. The rocks are in reality two, separated by the tongue of deeper water which makes into Naseway Shoal from the west and extends well toward the ridge of Trout Shoal.

The larger rock is hook shaped and contains two areas of dense growth and a long strip of very scattering oysters, both following the line of a shell ridge bare in parts at low water. The smaller area is a U-shaped ridge of scattering oysters lying between the deeper water just mentioned and the swash channel, which separates if from the adjacent Fishing Point Rock.

The following table shows the area, density of growth, and estimated oyster content of the rock:

OYSTER GROWTH ON DOG SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	16	155	104	1,664
Scattering	13	153	39	507
Very scattering	35	22	27	945
Depleted	118	41	12	1,416
Total	182	.....	.....	4,532

The dense areas produce market oysters in sufficient quantity to yield the tonger an average of about 12 bushels per day, the scattering area will yield about 6 bushels, and the very scattering about 3 bushels. On the depleted area the yield would be at no place more than about 2 or $2\frac{1}{2}$ bushels of marketable stock, and the average at all places examined was about 1 bushel.

The growth of young oysters on this rock is prolific, the density on the dense and scattering areas of market oysters being sufficient to yield the tonger an average of about 23 bushels per day. On the area of very scattering growth the yield should be about 3 bushels of young per day and on the depleted area about 4 bushels. The average of the latter is brought up by the very dense growth of young found in places close to the exposed ridge, where the quantity of market oysters was negligible. Over all of the area shown on the chart as depleted, excepting close to the productive areas, both clean shells and young were practically absent. The market oysters on this rock, like those on Trout Shoal and High Shoal, are comparatively small, averaging a little in excess of 400 per bushel.

The data on which the foregoing description is based are as follows:

DETAILS OF EXAMINATION OF DOG SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
79	Aug. 13, 1909	7.0	Dense	10.2	30.3	9.1	263	110	373
103	Aug. 14, 1909	5.5	do	3.7	21.0	6.0	160	73	233
104	do	5.5	do	4.2	21.2	3.0	165	36	201
491	Sept. 8, 1909	6.0	do	7.4	21.3	16.0	187	194	381
493	do	9.5	do	.0	.0	9.0	0	109	109
102	Aug. 14, 1909	4.5	Scattering	1.2	15.2	2.4	106	29	135
465	Sept. 3, 1909	6.0	do	9.2	21.7	4.1	201	49	250
78	Aug. 13, 1909	4.0	Very scattering	2.4	3.2	1.0	36	12	48
486	Sept. 8, 1909	8.0	do	.0	4.5	2.7	29	33	62
492	do	8.5	do	.0	2.0	3.0	13	36	49
494	do	7.0	do	.0	.0	2.1	0	25	25
496	do	6.5	do	.6	3.0	2.4	23	29	53
77	Aug. 13, 1909	7.5	Depleted	4.1	11.0	1.6	98	19	117
82	do	5.5	do	6.4	42.1	1.3	302	16	318
83	do	9.0	do	.3	.0	2.3	2	28	30
101	Aug. 14, 1909	10.0	do	.0	.3	.7	2	8	10
485	Sept. 8, 1909	11.5	do	.0	.3	2.3	2	28	30
487	do	6.5	do	.0	.0	.0	0	0	0
490	do	8.5	do	.0	.0	1.7	0	21	21
495	do	7.0	do	.0	.3	.0	2	0	2
500	do	6.5	do	.0	.3	.0	2	0	2
501	do	6.5	do	.0	.0	.0	0	0	0

FISHING POINT ROCKS.

These are two beds of considerable extent lying between High Shoal and Naseway Shoal and Fishing Point. The names by which they are known to the oystermen were not learned. One of these beds, embracing scattered and very scattered areas, lies between High Shoal and the Baylor line, almost surrounded by deeper water; the other, which includes dense, scattered, and depleted areas, lies along the Baylor line inside of Naseway Shoal, from which it is separated by a channel carrying from 8 to 10 feet at low water.

The statistics of the rocks are as follows:

OYSTER GROWTH ON FISHING POINT ROCKS.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	45	185	119	5,355
Scattering	77	178	82	6,314
Very scattering	47	70	44	2,068
Depleted	90	30	19	1,710
Total	259			15,447

It is estimated that on the dense area a tonger could take an average of 10 or 11 bushels of market oysters per day and on the scattering area about 7 bushels. On the very scattering area the water is rather deep, the beds in this vicinity ranging from about 12 to 22 feet at low water, and although the density of growth is fair as compared with other beds described, this reduces the probable yield to the tonger to an average of between 3 and 4 bushels per day. On the depleted

area the probable average yield is estimated at between 1½ and 2 bushels per day of tonging. On the area of scattering growth on the bed inside of High Shoal young growth is almost absent, giving the bottom the appearance of having been planted. On the very scattering area in the same bed the quantity of young is sufficient to yield about 6 bushels per day per tonger.

On the dense and scattering areas of the other bed there is a dense growth of young oysters, sufficient to yield on the former about 18 bushels and on the latter about 13 bushels per day. On the depleted bottom as a whole it would probably be impossible to take more than 3 bushels of young per day, though there are spots where the yield might be double that amount.

The following results were obtained from examinations:

DETAILS OF EXAMINATION OF FISHING POINT ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
466	Sept. 3,1909	8.0	Dense	3.8	27.4	8.5	203	103	306
467	do	8.0	do	1.2	24.7	11.2	168	135	303
62	Aug. 13,1909	14.0	Scattering	.0	.3	6.7	2	81	83
468	Sept. 3,1909	9.0	do	6.2	39.7	6.1	298	74	372
469	do	9.5	do	2.5	18.3	7.5	135	91	226
66	Aug. 13,1909	13.0	Very scattering	4.0	6.8	3.6	70	44	114
73	do	8.5	Depleted	2.6	6.9	2.0	62	24	86
84	do	10.0	do	.0	1.3	.7	8	8	16
99	Aug. 14,1909	9.0	do	.3	7.3	2.4	49	29	78
100	do	8.0	do	.3	.3	1.2	4	14	18

ROCKS BETWEEN FISHING POINT AND BALLARDS MARSH ROCKS.

In this region there are two small rocks for which no names were obtained. One of these lies close to the Baylor line and is encroached on by planted areas. It consists of a dense area inshore, the oysters becoming very scattering farther out, surrounded by a fringe of depleted bottom. The other bed is a small patch of very scattering growth about 400 yards farther out, in the direction of Dog Shoal Rock.

The following table exhibits the extent and condition of these beds:

OYSTER GROWTH ON ROCKS BETWEEN FISHING POINT AND BALLARDS MARSH ROCKS.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	5	183	268	1,340
Very scattering	8	1	31	248
Depleted	18	0	0	0
Total	31			1,588

The dense area varies considerably in productiveness, one spot near what appeared to be the center of the original bed producing a quantity of oysters sufficient to yield 50 bushels per day to the tonger, while in another place not more than 9 bushels could be taken.

On the very scattering area of the larger bed barely 3 bushels per day could be taken, but on the small isolated spot the growth was sufficient to yield about 4 bushels per day. The depleted area is practically bare of oysters of all sizes, and the quantity of shells is negligible. On the small strip in the dense bottom where the market oysters were most abundant there is a very dense growth of young, but the rest of the bed is deficient in this respect.

The following table gives the results of the several examinations of the beds:

DETAILS OF EXAMINATION OF BEDS BETWEEN FISHING POINT AND BALLARDS MARSH ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
93	Aug. 14, 1909	7.5	Dense	0.0	0.0	7.0	0	85	85
95	do	7.5	do	.0	56.4	37.3	366	451	817
98	do	7.0	Very scattering	.3	.0	3.1	2	37	39
464	Sept. 3, 1909	8.5	do	.0	.0	2.0	0	25	25
96	Aug. 14, 1909	8.5	Depleted	.0	.0	.0	0	0	0
97	do	8.5	do	.0	.0	.0	0	0	0
463	Sept. 3, 1909	8.5	do	.0	.0	.0	0	0	0

BALLARDS MARSH ROCK.

This is the bed called by Winslow "Bally Smash," probably an unconscious attempt to render a provincial pronunciation phonetically. It is the westernmost bed of Public Ground No. 6, Isle of Wight County. It follows the line of a shoal which sets offshore from Ballards Marsh.

Its extent and condition are epitomized in the following table:

OYSTER GROWTH ON BALLARDS MARSH ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Scattering	4	152	31	124
Very scattering	33	191	24	792
Depleted	142	45	7	894
Total	179	.....	.....	1,810

The scattering area is a small spot near the inner end of the shoal, where the quantity of market oysters is sufficient to yield to the tonger between 7 and 8 bushels per day. The very scattering growth is found on each side of this and beyond it for a distance of about two-thirds the length of the shoal, bearing a growth yielding about 3½ bushels of oysters per day's work. On both sides of the very scattering area and beyond it along the line of the shoal is a depleted bottom on which, as a whole, less than 1 bushel of oysters can be taken per day, the edges of the area being practically barren.

Along both sides of the shoal, even on the so-called depleted bottom which surrounds it at its outer end, is a heavy growth of young and many shells, which will yield on the average about 35 bushels of culls and spat per day. The market oysters on this bed will average about 400 to the bushel and the culls or seed oysters about 750.

DETAILS OF EXAMINATION OF BALLARDS MARSH ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
86	Aug. 14, 1909	3.0	Scattering	13.7	9.7	2.6	152	31	183
85	do	6.0	Very scattering	3.2	3.2	2.1	42	25	67
462	Sept. 3, 1909	5.0	do	6.6	21.7	2.0	184	25	209
514	Sept. 9, 1909	4.0	do	10.8	42.3	1.8	346	22	368
87	Aug. 14, 1909	6.0	Depleted	.3	2.3	1.4	17	17	34
88	do	7.0	do	.0	.0	.0	0	0	0
89	do	9.0	do	.0	.0	1.7	0	21	21
90	do	7.0	do	.0	.0	.0	0	0	0
91	do	7.0	do	.0	.3	1.8	2	22	24
461	Sept. 3, 1909	7.0	do	4.7	27.7	1.3	211	16	227
504	Sept. 9, 1909	6.0	do	.0	.0	.0	0	0	0
505	do	5.0	do	5.7	22.5	.4	183	5	188
506	do	4.5	do	7.4	21.0	.5	185	6	191
508	do	4.5	do	10.3	22.4	.2	213	2	215
513	do	6.0	do	.0	.0	.2	0	2	2
515	do	5.5	do	.0	.0	.9	0	11	11
516	do	6.0	do	.0	.0	.7	0	8	8
517	do	6.0	do	.0	.0	.2	0	2	2
518	do	7.0	do	.0	.0	.5	0	6	6
519	do	7.0	do	.0	.3	1.4	2	17	19
520	do	6.5	do	.0	.0	.0	0	0	0
521	do	5.5	do	.0	.0	.0	0	0	0

CREEK CHANNEL ROCK.

This is a small bed about 2 acres in extent, covering a shoal marked by a buoy of the Light-House Establishment. It has the indications of having been a dense bed, but at the present time it is depleted, and a tonger could take on it an average of hardly a bushel of oysters per day, and the young growth is still more sparse. It is surrounded by private beds. It constitutes Public Ground No. 5, Isle of Wight County.

The following observations were made on this bed:

DETAILS OF EXAMINATION OF CREEK CHANNEL SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bushels.*	*Bushels.*	*Bushels.*
383	Aug. 26, 1909	13.0	Depleted.....	0.0	0.0	1.4	0	19	19
384	.....do.....	6.0	.....do.....	0.0	1.1	.2	7	3	10

AARON SHOAL ROCK.

This is the only bed in Public Ground No. 2, Isle of Wight County. It is almost or quite surrounded by private beds, the boundary stakes of which formed a forest which made it difficult to tell, without spending on the bed more time than its importance warranted, what was planted ground and what was not.

The following statistics exhibit its present condition:

OYSTER GROWTH ON AARON SHOAL ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	2	129	100	200
Scattering	4	135	33	132
Very scattering	3	0	23	69
Depleted	24	112	5	120
Total	31	.....	.....	521

The dense area forms a very narrow strip along the northern edge close to and among the stakes. Its area could not be very definitely determined without wasteful expenditure of time, but is probably about 2 acres. About 10 bushels of oysters per day could be taken by the tonger.

On the scattering growth it is estimated that about 4½ bushels, and on the very scattering about 3 bushels, per day could be taken. The depleted area is for the most part bare. There is a good growth of young on the dense and scattered areas and at two spots on the depleted bottom.

The following examinations were made:

DETAILS OF EXAMINATION OF AARON SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
392	Aug. 26, 1909	8.5	Dense	0.0	6.0	9.7	39	134	173
396	.....do	5.5	.....do	5.7	28.0	4.7	219	65	284
389	.....do	5.5	Scattering	1.6	19.2	2.4	135	33	168
400	.....do	6.0	Very scattering	.0	.0	1.7	0	23	23
390	.....do	5.0	Depleted	6.7	24.2	1.3	201	18	219
391	.....do	8.5	.....do	5.0	10.3	.3	90	4	94
394	.....do	7.5	.....do	.0	.0	.0	0	0	0
395	.....do	6.5	.....do	5.3	18.7	.0	156	0	156

BROWNS SHOAL ROCKS.

Included under this name are a number of small rocks, separated by depleted and barren bottom lying at the extreme lower end of Public Ground No. 1, Warwick County, just above Newport News. The productive portions lie on Browns Shoal and a number of other shoal spots in the vicinity. The extent and present condition of the rocks as a whole are shown in the following table:

OYSTER GROWTH ON BROWNS SHOAL ROCKS.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	68	126	183	12,444
Scattering	44	142	54	2,376
Very scattering	27	88	39	1,053
Depleted	226	5	4	904
Total	365	.....	.....	16,777

The dense area is found in seven patches, of which the largest, covering about 25 acres, is on a shoal west of Browns Shoal surrounding a watchhouse or covered pierhead. The areas as a whole are quite productive of market oysters, and it is estimated that an industrious tonger working nine hours per day could take between 10 and 40 bushels of oysters, the average at all places examined being about 15 bushels.

The areas of scattering growth are three in number, lying on the ends of Browns Shoal proper and a small shoal west of it, inshore of the watchhouse above alluded to. They carry a depth of between about 4 or 5 and 12 feet at low water, and their productiveness is such that a tonger could take an average of between 5 and 6 bushels of market oysters per day.

The areas of very scattering growth are a number of small patches nearly all lying between the more prolific areas and the edges of the bed. They are nearly all covered by about 10 feet of water at low tide, and bear oysters in sufficient quantity to yield to the tonger between 3 and 4 bushels per day.

The depleted bottom constitutes nearly two-thirds of the total area of the beds as charted. At no place does it promise to yield during the present season more than 2½ bushels per day, and the major part of it is practically barren.

The growth of young oysters is very good on the shallower parts of the beds, especially on those portions yielding a scattering growth of market stock, where a tonger could take an average of about 15 bushels per day. On the dense areas as a whole the young growth is less abundant, the estimated average yield being about 11 bushels per day, the heaviest growth being on two small shoals between the inner end of Browns Shoal and the shipyard at Newport News.

On all of the productive areas there is an abundance of shells suitable for catching a set of spat, but the depleted areas are practically bare and give no promise of recuperation under any natural conditions.

The following exhibits the results of examinations:

DETAILS OF EXAMINATION OF BROWNS SHOAL ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
112	Aug. 16, 1909	9.5	Dense	4.7	31.9	12.0	238	165	403
122	do	9.5	do	.0	24.6	7.9	160	109	269
123	do	8.5	do	1.3	21.6	9.6	149	133	282
126	do	8.0	do	.0	10.7	7.3	70	101	171
139	Aug. 17, 1909	9.5	do	1.6	6.4	32.0	52	443	495
141	do	11.5	do	2.0	11.2	9.6	86	133	219
142	do	14.5	do	7.2	15.6	12.8	148	177	325
144	do	10.5	do	1.5	18.0	10.5	127	145	272
145	do	12.5	do	1.5	11.0	14.5	81	200	281
146	do	13.5	do	.0	9.2	24.4	60	337	397
450	Sept. 1, 1909	10.0	do	5.2	37.8	4.4	280	61	341
459	Sept. 3, 1909	10.5	do	5.0	21.2	10.8	170	149	319
460	do	10.5	do	2.1	16.2	20.8	119	287	406
524	Sept. 10, 1909	11.5	do	.0	4.0	9.0	26	124	150
115	Aug. 16, 1909	9.0	Scattering	.3	28.7	6.3	188	87	275
118	do	7.0	do	.6	21.2	4.0	141	55	196
119	do	6.0	do	.9	12.8	2.3	89	32	121
120	do	6.0	do	4.5	11.8	2.5	100	34	134
136	Aug. 17, 1909	10.0	do	3.6	25.6	4.4	190	61	251
138	do	9.0	do	2.0	31.0	4.0	214	55	269
143	do	12.5	do	.0	2.8	6.4	18	88	106
451	Sept. 1, 1909	7.5	do	12.3	34.0	3.0	301	41	342
452	do	11.0	do	7.3	20.4	5.8	180	80	260
453	do	10.0	do	2.9	12.1	4.6	98	64	162
117	Aug. 16, 1909	5.0	Very scattering	.2	12.9	2.2	85	30	115
125	do	10.0	do	.3	3.7	3.3	26	45	71
135	Aug. 17, 1909	11.0	do	2.0	6.0	3.2	52	44	96
140	do	11.0	do	.0	8.8	2.8	57	39	96
457	Sept. 3, 1909	11.0	do	8.2	26.2	2.5	223	35	258
458	do	10.5	do	2.9	9.6	3.8	81	52	133
523	Sept. 10, 1909	10.0	do	2.0	12.5	2.0	94	28	122
113	Aug. 16, 1909	12.6	Depleted	.0	5.7	2.0	37	28	65
114	do	10.5	do	.0	.0	.0	0	0	0
116	do	12.0	do	.0	.3	.0	2	0	2
124	do	12.0	do	.0	.0	.0	0	0	0
137	Aug. 17, 1909	12.0	do	.0	.0	.0	0	0	0
449	Sept. 1, 1909	18.0	do	.0	.0	.0	0	0	0
454	do	18.0	do	.0	2.3	1.4	15	19	34
455	do	10.5	do	.0	.0	.0	0	0	0
456	do	11.0	do	.0	.0	.0	0	0	0
522	Sept. 10, 1909	24.0	do	.0	.0	.0	0	0	0
567	Sept. 14, 1909	20.5	do	.0	.0	.0	0	0	0

GUN ROCK.

This is a small bed lying on a shoal spot west of the preceding. Its extent and estimated density of growth and contents are as follows:

OYSTER GROWTH ON GUN ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	6	198	152	912
Very scattering	16	62	30	480
Depleted	4	0	0	0
Total	26			1,392

The dense area forms a narrow tongue running along the inner or shoreward end of the ridge or backbone of the shoal, and it produces market oysters in sufficient quantity to yield the tonger about 9 bushels per day. There is no scattering growth, but the outer half of the length of the bed as far as the Baylor line produces a very scattering growth sufficient to yield about 3 bushels per day.

Along the higher parts of the ridge, on both the dense and very scattering bottoms, there is a prolific growth of young oysters, sufficient to furnish the tonger from 12 to 14 bushels per day. The edges of the very scattering area produce but few young oysters, and the depleted bottom is practically bare of both oysters and clean shells, its position being indicated solely by the presence of shells more or less deeply buried in the mud.

The following observations were made:

DETAILS OF EXAMINATION OF GUN ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
134	Aug. 17, 1909	16.0	Dense	2.0	28.5	11.0	198	152	350
147	.....do.....	6.5	Very scattering	.8	17.4	1.8	118	25	143
149	.....do.....	12.5	.....do.....	.0	1.0	2.5	6	34	40
148	.....do.....	12.5	Depleted	.0	.0	.0	0	0	0

KETTLE HOLE ROCK.

I am not certain of the name of this bed, as in the field some confusion arose as to whether this or the next was Thomas Point Rock. In designating it as above I have been guided by Winslow's nomenclature. This bed is the largest and most important in this part of

the river. It lies on the north side of a shallow ridge, extending thence shoreward toward Watts Creek as far as the Baylor line.

Its extent and present general condition are as follows:

OYSTER GROWTH ON KETTLE HOLE ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	258	317	105	27,090
Scattering	66	207	82	5,412
Very scattering	111	180	42	4,662
Depleted	11	0	0	0
Total	446			37,164

The principal area of dense growth starts from the ridge and extends as a broad belt as far as the Baylor line inshore. The public ground includes but a portion of the shoal, possibly because the southern part was taken up as private ground prior to the Baylor survey. The productive bottom probably extends across the ridge, but as it is not included in the public grounds and is staked as a private holding it was not examined. The growth of market oysters on the public ground is rather uniform and is sufficient to provide the tonger with from 8 to 13 bushels per day, the average being about 9 or 10. Near the middle of the inner part of the dense area is a small spot where market oysters are deficient in quantity, but the growth of young is so prolific that it has not been thought advisable to differentiate it on the chart. There is also a small area of dense growth on a shallow spot east of the main area.

The scattering growth on Kettle Hole Rock forms a fringe along the western border of the dense area, with a broad tongue thrust into the latter near its middle. The growth of market oysters is sufficient to yield to the tonger an average of about 6 bushels per day.

The areas of very scattering growth form a border on the eastern and inshore edges of the dense growth, and it is estimated that about 3 or 3½ bushels of oysters could be tonged per day on the areas taken in their entirety.

The depleted bottom is insignificant and bare of everything except a few buried shells.

There is a heavy growth of young oysters over practically the entire extent of this bed. On the dense areas they are estimated to be present in sufficient quantities to yield to the tonger about 28 bushels per day as an average at the beginning of the season, while on the scattering and very scattering areas the yield would probably average about 16 or 17 bushels. Undoubtedly the entire bed can be regarded as

presently and prospectively productive. The following data were obtained from the examinations made:

DETAILS OF EXAMINATION OF KETTLE HOLE ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
133	Aug. 17, 1909	10.0	Dense	8.5	47.5	10.0	364	138	502
155	do	13.5	do	5.0	62.0	7.5	436	104	540
156	do	11.5	do	1.5	29.9	7.8	204	108	312
157	do	11.5	do	.0	32.0	8.0	208	111	319
159	do	9.5	do	.0	44.6	.7	290	10	300
360	Aug. 26, 1909	11.5	do	5.0	27.5	11.7	211	161	372
361	do	11.5	do	2.1	18.5	7.6	134	105	239
362	do	10.5	do	8.1	54.6	9.6	408	133	541
363	do	8.5	do	6.5	47.2	6.1	349	84	433
364	do	7.5	do	7.6	46.7	7.9	353	109	462
365	do	8.0	do	9.6	72.4	6.5	533	90	623
158	Aug. 17, 1909	12.5	Scattering	5.0	34.6	5.5	257	76	333
163	Aug. 18, 1909	17.0	do	.7	50.0	6.9	334	95	429
359	Aug. 26, 1909	11.0	do	.9	3.8	5.4	31	75	106
151	Aug. 17, 1909	11.0	Very scattering	.0	16.0	4.0	104	55	159
152	do	13.0	do	.4	43.3	2.1	284	29	313
153	do	11.5	do	1.1	13.3	3.0	95	41	136
154	do	11.5	do	.2	24.0	3.3	169	46	215
369	Aug. 26, 1909	11.5	do	7.9	30.0	2.9	246	40	286
164	Aug. 18, 1909	14.0	Depleted	.0	.0	.0	0	0	0
165	do	16.0	do	.0	.0	.0	0	0	0

THOMAS POINT ROCK.

As explained in the discussion of the preceding bed, there may be some question as to the name of this one, which lies between what has been called Kettle Hole Rock and Blunt Point Rock. It is entirely separated from the former by a swash channel carrying from 12 to 21 feet of water, but is connected with Blunt Point Rock by a narrow ridge of depleted bottom. The bed lies on and about two shoals which extend from the edge of the channel lying north of White Shoal Light. Its extent and condition are as follows:

OYSTER GROWTH ON THOMAS POINT ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	76	168	115	8,745
Scattering	118	170	71	8,378
Very scattering	100	103	51	5,100
Depleted	127	80	21	2,667
Total	421			24,890

The dense growth of market oysters is in three patches, all lying on or close to the shoaler parts of the bed in water ranging from 5 to 8 feet at low tide. The growth is sufficiently prolific to yield to the tonger about 10 bushels of marketable oysters per day.

The area covered by scattering marketable oysters stretches from the western side of the longer shoal across some intervening deeper water to two small shoals to the westward. Over the whole area the density of growth is such that about 6 bushels of oysters may be taken per day.

The very scattered growth is in three areas fringing the denser parts of the bed. Its productiveness varies between areas which will yield 2½ and those which will yield 4½ bushels per day, the general average at all places examined being about 3½ bushels.

The best of the depleted bottom, which is in the areas lying on the edge of the deep-water channel, will yield about 2½ bushels per day, while the inshore area and that lying in the midst of the scattering growth will not yield an average of over 1 bushel.

The young growth is in good quantity, though not so abundant as on Kettle Hole Rock. On the dense and scattering areas it is sufficient to yield an average of about 15 bushels per day. On the very scattering area near the inshore end of the eastern edge of the rock it is in about the same abundance, but elsewhere it will yield not more than 4½ bushels per day's tonging. On the best of the depleted bottom, along the edge of the deep-water channel, it is estimated that about 10 or 11 bushels per day could be taken by the tonger, but on other parts of the depleted area young oysters are practically absent.

The oysters on this bed, as on all others on this shore of the river, are of fair size, the marketable stock averaging about 350 per bushel and the young approximately 750.

The following observations were made:

DETAILS OF EXAMINATION OF THOMAS POINT ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
127	Aug. 17, 1909	12.5	Dense	0.8	2.1	11.2	19	154	173
132	do	12.5	do	9.6	33.0	8.9	277	123	400
366	Aug. 26, 1909	8.5	do	3.9	33.1	10.3	241	142	383
367	do	8.5	do	13.4	13.8	5.8	177	80	257
374	do	13.0	do	5.8	13.6	5.5	126	76	202
128	Aug. 17, 1909	14.5	Scattering	2.0	21.2	6.0	151	83	234
129	do	12.5	do	2.5	24.0	4.5	172	62	234
130	do	13.5	do	1.5	9.5	5.5	71	76	147
131	do	9.5	do	5.5	24.0	5.5	192	76	268
160	Aug. 18, 1909	9.0	do	3.0	31.1	5.7	221	79	300
161	do	9.0	do	2.9	27.7	5.1	199	70	269
368	Aug. 26, 1909	8.5	do	10.0	28.6	1.8	251	25	276
372	do	11.0	do	2.3	13.2	7.1	101	98	199
162	Aug. 18, 1909	13.0	Very scattering	1.2	13.5	2.4	97	33	130
166	do	15.5	do	2.7	45.9	5.5	316	76	392
371	Aug. 26, 1909	14.0	do	.0	4.5	3.3	29	46	75
375	do	17.0	do	.0	6.8	3.6	44	50	94
376	do	13.0	do	.0	4.5	3.8	29	52	81
168	Aug. 18, 1909	9.5	Depleted	1.3	18.5	1.8	129	25	154
172	do	15.0	do	2.7	24.6	2.7	177	37	214
373	Aug. 26, 1909	13.0	do	.0	1.2	.9	8	12	20
377	do	13.0	do	.3	1.0	.7	8	10	18

BLUNT POINT ROCK.

This is the uppermost bed in that part of Public Ground No. 1, Warwick County, in which the cull law is enforced. All beds above this, excepting the small one in Warwick River, are within the area which is set apart for seed production. This rock is rather attenuated in most of its parts, being in the shape of an irregular ring surrounding a deeper barren area, with a long tail running along the Baylor line in the direction of Deep Creek. The highly productive area is very limited and the very scattering growth constitutes more than half of the total area. The extent and general condition of the bed at the time of the survey are shown in the following table:

OYSTER GROWTH ON BLUNT POINT ROCK.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	16	171	161	2,576
Scattering	69	193	60	4,140
Very scattering	225	105	45	10,125
Depleted	118	42	14	1,652
Total	428	.....	.....	18,493

The bottom covered with a dense growth occurs on two small patches on small shoals, on which about 15 bushels of market oysters could be taken in a day.

There are three areas of scattering growth, of about equal productiveness so far as market oysters are concerned. One of these is at the extreme end of the rock off Deep Creek, which is in close proximity to planted beds and bears some indications of being itself planted ground. These areas as a whole will yield, it is estimated, an average of about 6 bushels per day.

The very scattering growth consists of a narrow zone almost encircling the included barren area above alluded to and a prolongation northward toward Deep Creek. The examinations made on it indicate a probable yield of about 3½ bushels per day of continuous tonging.

The depleted area skirts the preceding for a good part of its length, and in addition forms a projection on the western part of the bed and a small isolated patch on a shoal just beyond it. Its content of oysters is such that it could furnish the tonger with hardly more than a bushel per day.

The young growth is in good quantity on the dense and scattering areas of oysters, excepting that nearest Deep Creek, where it is practically absent. With the exception noted, the tonger should be able to gather about 15 bushels per day. On the narrow annular part of

the beds the production of young oysters is good on the very scattering and depleted areas, which in their other parts are deficient in immature growth.

The following data furnish the basis for the foregoing:

DETAILS OF EXAMINATION OF BLUNT POINT ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
252	Aug. 21, 1909	9.5	Dense	7.9	17.5	7.5	165	103	268
253	do	12.5	do	3.1	24.5	15.9	178	219	397
180	Aug. 18, 1909	12.5	Scattering	1.5	33.9	5.3	230	73	303
187	do	6.5	do	.0	.8	3.5	5	48	53
254	Aug. 21, 1909	11.0	do	.3	22.9	4.2	151	58	209
173	Aug. 18, 1909	16.0	Very scattering	.9	5.0	4.6	38	63	101
175	do	10.5	do	2.6	42.3	3.5	292	48	340
178	do	10.5	do	1.3	27.1	2.9	184	40	224
182	do	11.0	do	2.0	7.1	3.7	59	51	110
188	do	9.5	do	.0	4.0	2.0	26	28	54
380	Aug. 26, 1909	14.5	do	1.0	3.1	4.1	27	57	84
381	do	13.0	do	.3	16.0	2.1	106	29	135
174	Aug. 18, 1909	16.0	Depleted	1.9	35.2	2.6	241	36	277
177	do	13.5	do	.0	.0	.0	0	0	0
179	do	16.5	do	.0	3.6	.9	23	7	30
181	do	13.5	do	.0	.0	.0	0	0	0
189	do	8.5	do	1.3	12.1	1.3	87	18	105
190	Aug. 19, 1909	9.5	do	.0	.0	1.3	0	18	18
251	Aug. 21, 1909	11.5	do	.8	2.9	1.3	24	18	42
378	Aug. 26, 1909	12.5	do	.0	.0	1.8	0	25	25
379	do	15.5	do	.0	.0	.0	0	0	0

WHITE SHOAL ROCKS.

These are two rocks in very shallow water, with slightly greater depths between and deep channels surrounding. The westernmost lies about a bare shell bank and the easternmost is nearly awash at low water.

The following exhibits their extent and condition at the beginning of the oyster season of 1909–10.

OYSTER GROWTH ON WHITE SHOAL ROCKS.

Character of growth of market oysters.	Area.	Oysters per acre.		Estimated content of market oysters.
		Seed.	Market.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*
Dense	44	312	127	5,588
Very scattering	10	108	36	360
Depleted	52	53	12	624
Total	106			6,572

The dense areas produce a good quantity of marketable oysters and at the beginning of the present season should be capable of yielding about 12 bushels of oysters per full day of tonging. There are no areas of scattered growth within the definition of this report, but at

each end of the western rock there is a small patch of very scattering growth capable of yielding an average of 3½ bushels of marketable oysters per day.

The area charted as depleted bears very few marketable oysters.

The young growth on the dense areas is very prolific, being in sufficient quantity to afford a daily return to the tonger of about 35 bushels. On the scattering bottom about 10 bushels per day could be taken, while on the depleted bottom as a whole the average would hardly exceed 4 bushels, although two or three times that many could be taken in places.

DETAILS OF EXAMINATION OF WHITE SHOAL ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth of market oysters.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
		Feet.					*Bush.*	*Bush.*	*Bush.*
169	Aug. 18, 1909	5.5	Dense	7.7	92.3	6.5	650	90	740
170	do	8.5	do	3.8	10.4	9.2	92	127	219
443	Sept. 1, 1909	10.0	do	11.7	63.3	7.1	487	98	585
444	do	10.0	do	11.7	29.6	17.9	268	247	515
445	do	13.0	do	15.2	26.9	8.3	274	115	389
447	do	9.5	do	10.0	28.4	7.1	250	98	348
556	Sept. 14, 1909	9.5	do	6.1	26.2	11.6	210	160	370
557	do	4.0	do	11.5	29.3	5.7	265	79	344
558	do	7.5	Very scattering	2.0	8.7	3.0	70	41	111
562	do	10.5	do	2.6	19.7	2.3	145	32	177
552	do	9.0	Depleted	.3	1.3	.3	10	4	14
553	do	8.5	do	1.0	6.3	1.0	47	14	61
554	do	6.5	do	.3	.0	.0	2	0	2
555	do	12.5	do	1.9	11.0	1.9	84	26	110
559	do	10.5	do	4.6	21.0	1.8	166	25	191
561	do	11.5	do	.3	.3	.3	4	4	8

SEED OYSTER AREA.

JAIL ISLAND ROCK.

For this and all of the following rocks the standard of density of growth is different from that adopted in the preceding descriptions. The cull law, so far as it relates to the size of oysters, does not apply, and oysters of whatever size may be taken. The entire content of the bed, both young and old, is therefore taken into consideration, and as the average price of seed oysters is about two-thirds of that of the market oysters from the James River, a larger quantity has to be taken to furnish a living wage. In all of the following descriptions a bed is regarded as dense when 12 or more bushels may be taken by a tonger in a day's work, as scattering when it will yield between 8 and 12 bushels, very scattering when it yields between 4 and 8, and depleted if less than 4 bushels can be tonged per day. As the market oysters sell for 45 cents and the seed oysters for but 30 cents per bushel, the financial return is essentially equal.

Jail Island Rock, which extends alongshore west of the mouth of Warwick River, is continuous at its offshore edge with Wreck Shoal

Rock, the boundary between them as adopted in this report being purely arbitrary.

The extent and general condition of the bed at the time of the survey was as follows:

OYSTER GROWTH ON JAIL ISLAND ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	227	143	32,461
Scattering	198	109	21,582
Very scattering	14	28	392
Depleted	508	8	4,064
Total	947	.....	58,499

The principal area of dense growth runs from the inner edge of Wreck Shoal Rock in a gradually narrowing belt to a tongue extending to within 200 or 300 yards of shore between Jail Island and the mouth of Warwick River. The depth of water gradually decreases from about 9 feet to 2 or 3 feet at low water, near Jail Island. There is also a small area of dense growth lying on an isolated patch in about 10 or 11 feet of water off the mouth of Warwick River, which, being just on the cull line, is arbitrarily included in the Jail Island bed for the purposes of this report. The dense bottom as a whole will afford the tonger an average catch per day of about 17 bushels of oysters of all sizes.

The area of scattering growth lies in a single body north and west of the preceding in from 6 to 11 feet of water. The growth on the whole is rather heavier in the deeper water, and as an average should yield approximately 9 bushels per day.

The very scattering growth is in a small patch immediately east of Jail Island, where the yield to the tonger should be about 5 bushels per day.

The depleted bottom forms a broad zone on the inshore side and a narrow strip on the eastern edge of the bed. There is also a depleted area adjoining the small, isolated, dense patch before described, and a small patch lying between that and the main bed. In most places the so-called "depleted bottom" is practically bare. There is but a moderate supply of shells on the dense area and on the scattering area close to it, but elsewhere the bed is deficient in this respect.

It is stated that the inshore portions of the bed, on the depleted bottom along the Baylor line, produce fine single oysters, which in calm weather are picked up one by one and bring a high price in the markets. The survey did not disclose any quantity of such oysters.

DETAILS OF EXAMINATION OF JAIL ISLAND ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
184	Aug. 18, 1909	11.0	Dense	1.3	49.0	4.6	306
198	Aug. 19, 1909	7.0	do	1.7	12.1	2.5	97
199	do	6.0	do	.0	8.5	6.9	138
200	do	4.0	do	1.5	8.8	4.2	110
404	Aug. 27, 1909	4.0	do	1.3	3.3	2.8	62
207	Aug. 19, 1909	10.0	Scattering	4.6	8.2	2.1	88
210	do	11.5	do	5.4	16.7	2.5	140
211	do	8.5	do	.0	2.7	6.2	99
402	Aug. 27, 1909	4.0	Very scattering	1.1	1.9	.9	28
183	Aug. 18, 1909	11.0	Depleted	.0	.0	.0	0
185	do	12.0	do	.4	1.7	1.3	32
192	Aug. 19, 1909	9.0	do	.0	.0	.7	8
208	do	7.5	do	.0	.0	.0	0
212	do	6.5	do	.0	.3	.3	6
401	Aug. 27, 1909	5.5	do	.7	.7	.0	7
403	do	4.0	do	.0	.0	.0	0

WRECK SHOAL ROCK.

This is a large, important, and productive bed extending from the preceding to the edge of deep water. For the purposes of this report, it is regarded as including the oyster growth on and about Wreck Shoal proper and the small shoal to the westward of its outer end. Excepting where it adjoins Jail Island bed, its boundaries are rather sharply defined by a sudden shoaling of the water. This is especially pronounced at the southern edge of the bed, where the bottom very abruptly rises from about 150 feet to within 6 feet of the surface. North of the smaller shoal the bed is prolonged into a narrow belt occupying a slightly shoaling ridge connected with a corner of Mulberry Swash Rock. The depth at low water varies from less than 5 feet on the shoals to 12 or 15 feet at the edges. On one small area projecting as a tongue from the southeast side the water reaches a maximum depth of 30 feet.

Wreck Shoal Rock is practically everywhere highly productive and no part of it falls below the standard here regarded as constituting denseness of growth. Accepting the arbitrary inner boundary here adopted, it has an area of about 506 acres. The oyster growth at the places examined ranges from 178 to 497 bushels per acre, the average being about 316. The heaviest growth is as a rule found on the shoaler places, which facilitates the removal of the product. This materially raises the average daily yield to the tonger, which ranges in different places from 12 bushels to 51 bushels, with a general average for the entire bed of over 29 bushels.

The bottom is well covered with clean shells and the bed can be regarded as being in a healthy and promising condition. In a few places there is a fair growth of large oysters and on the bed as a

whole the young growth over 1 inch in length is numerically more than double that under 1 inch.

The following table exhibits the data obtained from the several examinations made:

DETAILS OF EXAMINATION OF WRECK SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
193	Aug. 19, 1909	12.0	Dense	0.0	16.7	10.3	195
194	.....do.....	9.0	.....do.....	7.1	30.3	.0	191
195	.....do.....	8.0	.....do.....	2.5	24.6	3.8	178
196	.....do.....	9.0	.....do.....	23.7	34.6	.4	301
197	.....do.....	6.5	.....do.....	17.9	69.2	5.0	497
201	.....do.....	12.0	.....do.....	18.3	28.6	1.4	254
202	.....do.....	11.0	.....do.....	21.8	44.6	3.6	379
203	.....do.....	11.0	.....do.....	9.5	57.7	.0	343
204	.....do.....	10.0	.....do.....	26.7	46.9	.3	379
205	.....do.....	7.0	.....do.....	43.0	45.0	.4	456
206	.....do.....	11.5	.....do.....	15.8	18.9	4.2	222
209	.....do.....	14.5	.....do.....	12.7	31.8	2.3	252
428	Aug. 31, 1909	15.0	.....do.....	3.6	30.0	2.7	200
429	.....do.....	6.5	.....do.....	38.1	41.2	.8	413
430	.....do.....	8.5	.....do.....	27.7	60.0	1.2	460
431	.....do.....	16.5	.....do.....	9.5	30.9	.4	201

DRY SHOALS ROCKS.

These are 5 small rocks lying west of the preceding on and about shoals which ebb nearly or quite bare. They are in general isolated and surrounded by deep water, though two of them are connected by narrow ridges of depleted bottom with Swash Rock and Mulberry Swash Rock, respectively.

Their present condition and extent are shown in the following table:

OYSTER GROWTH ON DRY SHOALS ROCKS.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	126	244	30,766
Scattering	18	124	2,232
Very scattering	9	85	765
Depleted	21	20	420
Total	174	.....	34,183

Four of these rocks are composed wholly or in major part of bottom bearing a dense growth of oysters, while the fifth, the smallest, bears a scattering growth exclusively. The dense growth in its daily yield to the tonger varies, with the locality, between 13 and 59 bushels, the average density over the entire area being sufficient to permit a

daily catch of about 30 bushels per man. The average depth of water is about 5 to 7 feet at low tide.

The scattering growth is found in two places, one an isolated rock of small size and the other at the extremity of a larger bed where the productive bottom runs off to deeper water. There is not much difference in the density of the growth on the two places, and it is estimated that on the two a tonger could take an average of about 10 bushels of oysters per day.

The very scattering bottom lies in two small patches at opposite ends of the longest bed of the group, and the growth is so sparse as barely to remove the areas from the category of depleted bottom. The depleted areas are three in number, one in the deeper water at the tip of a rock and the others on the two connecting ridges mentioned earlier in this description. About the same numerical proportion exists between the culls and spat as on the preceding bed, and at one place on the dense area there is a good growth of marketable oysters averaging between 400 and 450 per bushel. There is a fair or good deposit of shells throughout the dense and scattering areas and on the apical area of very scattering growth, but elsewhere the rocks are deficient in this respect.

DETAILS OF EXAMINATION OF DRY SHOALS ROCKS.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
340	Aug. 25, 1909	7.0	Dense	16.4	26.4	0.0	218
341	do	7.0	do	11.7	30.0	4.2	258
342	do	5.0	do	21.9	38.5	2.3	343
347	do	11.0	do	5.1	20.9	2.0	154
348	do	10.0	do	10.6	36.6	.6	247
349	do	5.0	do	20.3	57.7	.0	398
351	do	5.5	do	13.3	14.0	1.3	153
352	do	5.5	do	9.7	15.3	.3	130
438	Aug. 31, 1909	7.0	do	15.7	21.3	.7	195
439	do	8.0	do	11.1	43.0	12.3	408
440	do	6.0	do	15.4	23.6	.4	203
343	Aug. 25, 1909	14.0	Scattering	3.1	11.4	4.0	117
442	Aug. 31, 1909	12.0	do	5.8	19.3	.3	131
337	Aug. 25, 1909	11.0	Very scattering	.8	2.5	2.9	48
344	do	17.0	do	6.1	11.2	3.1	121
437	Aug. 31, 1909	14.0	Depleted	.0	1.8	.9	19
441	do	9.0	do	.0	1.4	1.4	22

POINT OF SHOALS ROCK.

This name is here given to a large area of varying productiveness lying between the preceding, Long Shoal and Point of Shoals Lighthouse, but it is possible that the name as used by the oystermen may not strictly accord with this usage. Scattered over the area are a number of small shoals ebbing nearly or quite bare, but the average depth is in general between 6 and 8 feet. Excepting at its northern edge, where an imaginary line separates it from Long Shoal Rock,

the bed is everywhere bounded by the deep water of the ship channel or a swash channel which separates it from Dry Shoals and Swash Rocks. Where it faces the ship channel there is for most of the distance a border of barren bottom lying between the bed proper and deep water.

The condition and extent of the bed at the time of the survey was as follows:

OYSTER GROWTH ON POINT OF SHOALS ROCK.

Character of growth.	Area.	Oysters per acre.	Total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	254	200	50,800
Scattering	155	93	14,415
Very scattering	239	42	10,038
Depleted	142	15	2,130
Total	790	.....	77,383

The dense areas are three, one near the eastern end of the bed, another adjoining the corresponding area of Long Shoal Rock, and the third an isolated spot on a shoal in the swash channel. The densest growths occur as a rule on the shoaler spots, especially at the eastern end of the bed, from the isolated area above alluded to to the ship channel. In this area the average growth is about 275 bushels of oysters to the acre—considering the depths, sufficient to yield about 38 bushels per day's tonging—while the average of the whole area of dense growth would not exceed 25 bushels per day.

There are four scattering areas, one of which, near the eastern apex of the bed, is insignificant. On these as a whole a tonger should average, at the beginning of the season, about 10 bushels per day.

The very scattering growth is distributed in three areas, of which one adjoins the dense growth on the isolated patch in the swash channel. They are barely prolific enough to raise them above the assumed limit of depletion.

The depleted area is in five patches or borders along the free boundary of the bed. They are entirely negligible in their productiveness.

On the dense and scattering areas the proportion of very small to small oysters is higher than on the beds previously described, and there are several places on each where the growth of oysters above 3 inches long is fair.

On the dense areas the deposit of shells is abundant, on the areas of scattering growth it is ample, while the areas with a very scattering growth and the depleted bottoms are decidedly deficient. In general the latter two areas are of no present and little prospective value.

DETAILS OF EXAMINATION OF POINT OF SHOALS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
321	Aug. 25,1909	5.0	Dense	8.7	10.5	0.3	101
327	.....do.....	5.5	.....do.....	11.9	10.3	.3	116
328	.....do.....	7.5	.....do.....	7.7	9.3	7.0	162
329	.....do.....	7.5	.....do.....	17.3	23.3	4.3	253
334	.....do.....	8.5	.....do.....	8.7	33.4	1.3	229
336	.....do.....	4.0	.....do.....	33.9	34.8	.3	353
356	.....do.....	10.0	.....do.....	4.3	16.0	5.7	165
311	Aug. 24,1909	7.5	Scattering	8.0	6.3	.7	81
319	Aug. 25,1909	7.0	.....do.....	.2	5.7	4.3	76
335	.....do.....	7.5	.....do.....	6.2	13.3	.4	104
354	.....do.....	8.0	.....do.....	.8	5.0	5.8	92
358	.....do.....	8.0	.....do.....	2.0	6.3	6.7	114
308	Aug. 24,1909	7.5	Very scattering	.0	1.0	5.6	65
310	.....do.....	7.5	.....do.....	.3	.0	.3	5
320	Aug. 25,1909	7.0	.....do.....	.7	2.3	1.7	34
357	.....do.....	8.0	.....do.....	1.3	2.7	2.7	50
527	Sept. 11,1909	6.5	.....do.....	.5	4.0	2.9	54
309	Aug. 24,1909	7.5	Depleted	.0	.0	.0	0
326	Aug. 25,1909	9.5	.....do.....	.0	.0	1.1	12
333	.....do.....	10.5	.....do.....	1.7	2.1	1.7	38
355	.....do.....	9.0	.....do.....	.0	.0	.0	0
531	Sept. 11,1909	7.0	.....do.....	.0	2.4	1.1	24

SWASH ROCK.

This bed lies inshore of the preceding, nearly surrounded by swash channels. It is connected by narrow isthmuses with Long Shoal and Dry Shoal Rocks and adjoins V Rock to the westward. It consists of a dense area surrounding two shoals ebbing bare, and two depleted areas which connect it with adjoining beds.

Its condition and extent in August, 1909, was as follows:

OYSTER GROWTH ON SWASH ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	146	293	42,778
Depleted	115	15	1,725
Total	261	.....	44,50

The dense area as a whole is prolific in its product, but the middle part of the bed, between the shoals pots, is less densely covered than the surrounding area. It is estimated that at the beginning of the season a tonger could take an average of about 39 bushels of oysters per day. The covering of clean shells is sufficient to guarantee a good strike under favorable conditions. The depleted bottom is practically bare of oysters and shells and is at present and potentially worthless under natural conditions.

The following examinations were made during the survey:

DETAILS OF EXAMINATION OF SWASH ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
324	Aug. 25, 1909	5.0	Dense	29.2	41.4	0.0	360
325	.....do.....	7.0	.....do.....	12.3	17.3	7.0	226
228	Aug. 20, 1909	12.0	Depleted	.0	.0	.0	0
323	Aug. 25, 1909	9.0	.....do.....	.0	1.2	1.9	27
437	Aug. 31, 1909	14.0	.....do.....	.0	1.8	.9	19

MULBERRY SWASH ROCK.

This is a long narrow bed lying between Swash and V rocks on the outside and the so-called Marshy Island Rock on the shoreward side. At its southeastern end it is connected by narrow strips of indifferent productiveness with Wreck Shoal and Dry Shoal rocks, and its offshore boundary is the edge of the deep swash channel running toward Mulberry Point.

It consists essentially of bottom carrying a dense growth, interrupted at two places by areas of inferior productiveness. Its condition and extent in the latter part of August, 1909, are shown in the following table:

OYSTER GROWTH ON MULBERRY SWASH ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	422	302	127,444
Scattering	34	106	3,604
Very scattering	20	130	2,600
Depleted	29	43	1,247
Total	505	.....	134,895

The dense area bears a growth varying from 161 to 570 bushels per acre, and the depths vary from 8 to upward of 20 feet. The heavier growth is as a rule in the shoaler water, though this rule is not without exceptions. It is estimated that a tonger could take an average of about 23 bushels per day at the beginning of the season.

The scattered area is limited in extent and bears a growth of between 88 and 117 bushels per acre, in a depth of between 13 and 15 feet, and it is estimated that it will yield about 8 bushels per day.

The area of very scattering growth connects this bed with Wreck Shoal Rock, and although, as shown by the foregoing table, the growth is heavier than on the preceding area, it lies in between 18 and 20 feet of water and will therefore be less productive to the tonger, its estimated initial yield being about 7 bushels per day. The depleted area is in several small patches.

There is an abundant supply of shells on the dense area, a quantity of doubtful sufficiency on the bottoms bearing scattering and very scattering growths, and a deficiency on the depleted bottom.

DETAILS OF EXAMINATION OF MULBERRY SWASH ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
213	Aug. 19, 1909	14.0	Dense	7.8	13.3	7.4	187
219	Aug. 20, 1909	10.0	do	48.8	42.1	3.3	498
220	do	12.0	do	13.9	11.6	2.9	161
226	do	17.5	do	20.5	23.7	8.7	319
227	do	12.5	do	3.2	27.3	9.6	259
230	do	12.0	do	16.1	16.5	.6	173
238	do	15.0	do	26.5	31.9	2.3	322
331	Aug. 25, 1909	16.5	do	16.8	30.0	6.8	312
338	do	9.0	do	23.8	80.0	4.2	570
346	do	11.0	do	28.9	34.0	.3	324
432	Aug. 31, 1909	16.5	do	27.2	17.2	2.3	200
433	do	13.0	Scattering	5.7	10.9	.3	88
435	do	13.0	do	5.8	10.7	2.7	113
436	do	14.0	do	3.6	17.3	1.0	117
345	Aug. 25, 1909	18.0	Very scattering	5.4	16.4	1.8	130
434	Aug. 31, 1909	17.0	Depleted	.5	4.1	1.8	43

MARSHY ISLAND ROCK.

This lies between Mulberry Swash Rock and the inshore boundary of the public ground, principally in the "addition" which was made a part of the ground subsequent to the Baylor survey. The name here employed is coined for the purpose of this report, as the name by which this area of oyster bottom is known to the oystermen, if it has a distinctive name, was not ascertained by the survey. The outer or offshore boundary of the bed is defined more or less sharply by a channel, carrying a maximum of from 21 to 27 feet of water, between this and Mulberry Swash Rock.

The condition and extent of this bed about the middle of August, 1909, was as follows:

OYSTER GROWTH ON MARSHY ISLAND ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	197	231	45,507
Scattering	322	129	41,538
Very scattering	235	85	19,975
Depleted	387	18	6,966
Total	1,141		113,986

The dense areas lie in three isolated patches which exhibit no material shoaling over the surrounding bottom, except where they touch the channel which bounds the bed offshore. The depth of water on

the several areas ranges between 6 and 16 feet, and the density of growth between 142 and 410 bushels per acre. It is estimated that the bottoms are capable of producing an initial yield of about 18 bushels per day.

The scattering area occupies a general central position in the bed surrounding one of the dense spots. The depth varies from 10 feet inshore to about 22 feet at the edge of the channel, and the quantity of oysters varies between 92 and 186 bushels per acre. The estimated daily yield to the tonger is about 10 bushels.

The bottom covered by a very scattering growth forms a zone encircling the inner edge of the preceding. It lies in a depth varying from 7 to 16 feet, and, although the examinations were not as numerous as they should have been, they indicate that the growth is sufficient to yield an average of between 6 and 7 bushels per day.

The depleted bottom lies in a belt on the inside edge of the bed. It is practically bare of oysters and shells.

Shells are found in fair quantities on the dense bottom and on the outer parts of the scattering growth, but are deficient on the inshore parts of the latter, on most of the area of very scattering growth, and on the depleted area.

The following observations were made:

DETAILS OF EXAMINATION OF MARSHY ISLAND ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
217	Aug. 19, 1909	13.0	Dense	5.4	12.7	4.6	142
225	Aug. 20, 1909	12.5	do	6.2	23.1	1.9	170
232	do	14.0	do	10.4	54.3	8.3	410
239	do	11.5	do	7.7	11.5	9.6	201
221	do	13.0	Scattering	6.7	9.6	.8	92
222	do	14.0	do	8.1	9.2	1.2	102
224	do	9.5	do	2.1	8.8	7.5	136
231	do	17.0	do	10.9	23.6	.9	186
233	do	11.0	do	7.3	12.1	2.8	129
223	do	9.0	Very scattering	1.2	5.8	4.2	81
234	do	16.0	do	4.5	15.9	.5	109
218	Aug. 19, 1909	12.0	Depleted	.0	.8	1.3	18

LONG SHOAL ROCK.

This triangular bed flanks a shoal, ebbing bare in many places, which extends eastwardly from Point of Shoals lighthouse for a distance of upward of 1½ miles. As understood in this report, its boundary is an imaginary line running from Point of Shoals light toward Jail Island at an average distance of about 300 to 400 yards from the crest of the shoal, as far as the swash channel opening toward the northwest, along the edge of this channel to its mouth, and thence to the starting point. The main body of the rock, therefore, lies north of the crest of the bar. Its condition and extent about the beginning of September, 1909, were as follows:

OYSTER GROWTH ON LONG SHOAL ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	331	241	79,771
Scattering	10	64	640
Very scattering	84	60	5,040
Depleted	79	16	1,264
Total	504	.....	86,715

A dense growth of small oysters, with a good proportion of larger ones in a few spots, covers the major part of the bed. At various places the total growth varies between 148 and 364 bushels per acre, and it is estimated that at the beginning of the season a tonger could take about 28 bushels per day.

The scattering growth is comprised in one small spot about 100 to 200 yards from the lighthouse, where about 9 bushels per day may be taken.

The very scattering growth lies in two small patches along the western border of the bed and a larger area south of the ridge is continuous with similar bottom on Point of Shoals Rock. It is capable of yielding between 6 and 7 bushels per day. The depleted area lies south of the outer half of the ridge, with a small patch on the swash channel. It is practically bare of oysters and shells.

The areas bearing oysters in dense and scattering growth are covered with a supply of shells amply sufficient to serve the purposes of cultch. The small patches of very scattering growth are also fairly covered, but the large area south of the ridge and the depleted area adjoining are deficient.

The following observations were made:

DETAILS OF EXAMINATION OF LONG SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
295	Aug. 24, 1909	8.0	Dense	25.8	29.7	2.3	308
296	.....do.....	10.0	.....do.....	20.4	25.4	.4	237
298	.....do.....	12.5	.....do.....	11.9	13.4	9.6	232
299	.....do.....	6.5	.....do.....	22.8	17.1	2.5	230
300	.....do.....	6.5	.....do.....	19.2	10.0	12.5	283
301	.....do.....	7.5	.....do.....	20.3	7.3	.7	148
313	.....do.....	8.0	.....do.....	19.7	25.8	.0	232
318	.....do.....	6.0	.....do.....	40.7	30.7	.0	364
322	Aug. 25, 1909	5.0	.....do.....	.0	4.6	13.1	164
529	Sept. 11, 1909	5.0	.....do.....	19.7	21.4	.0	210
541	.....do.....	6.0	Scattering	1.1	6.6	2.3	64
297	Aug. 24, 1909	11.0	Very scattering	6.1	4.5	1.9	74
312	.....do.....	9.0	.....do.....	2.1	3.3	4.2	72
538	Sept. 11, 1909	4.0	.....do.....	3.9	3.2	.0	36
307	Aug. 24, 1909	8.5	Depleted	1.4	1.1	2.5	39
528	Sept. 11, 1909.	6.5	.....do.....	.0	1.1	.5	11
534	.....do.....	7.0	.....do.....	1.3	3.4	.3	27
535	.....do.....	7.0	.....do.....	.0	.5	.3	6
539	.....do.....	6.0	.....do.....	.2	.5	.2	6
540	.....do.....	6.0	.....do.....	.5	.5	.2	7

V ROCK.

This bed takes it name from the shape of a bare shoal near its southwestern edge. It is inshore of the preceding rock and adjoins Swash Rock to the southeast.

The area and character of growth on the bed are epitomized in the following table:

OYSTER GROWTH ON V ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	240	227	54,480
Very scattering	73	84	6,132
Depleted	73	15	1,095
Total	386	.....	61,707

The dense area occupies the middle belt of the bed and carries a growth of between 144 and 344 bushels per acre, the average estimated yield per day to the tonger being about 21 bushels.

The very scattering growth lies along the northwestern edge of the bed and on a comparatively shallow ridge along the swash channel near its mouth. It bears oysters in a quantity to yield about 7 bushels per acre.

The depleted area adjoins similar bottom on Swash Rock and is practically bare of both oysters and shells. The supply of shells on the rest of the bed is ample to secure their reseeding under proper conditions.

The data for the bed are as follows:

DETAILS OF EXAMINATION OF V ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
229	Aug. 20, 1909	9.0	Dense	31.8	16.5	1.7	265
235	.....do.....	12.5	.....do.....	10.8	45.7	.4	293
236	.....do.....	10.5	.....do.....	20.6	19.4	.0	204
268	Aug. 23, 1909	12.5	.....do.....	4.4	15.2	9.6	203
303	Aug. 24, 1909	9.5	.....do.....	21.7	10.4	.8	173
304	.....do.....	7.5	.....do.....	18.3	10.0	.0	144
305	.....do.....	6.5	.....do.....	47.7	19.7	.0	344
306	.....do.....	15.5	.....do.....	13.9	14.6	4.8	197
317	.....do.....	10.0	.....do.....	22.5	18.7	.8	219
302	.....do.....	9.5	Very scattering	2.5	7.9	2.9	84
315	.....do.....	10.0	Depleted	1.3	.4	2.1	31
316	.....do.....	10.0	.....do.....	.0	.0	.0	0

MOORES ROCK.

The bed known to the oystermen by this name lies on a shoal surrounded by deep water about halfway between Point of Shoals Light-House and Mulberry Point. It consists principally of bottom bearing a dense growth, with a scattering fringe along the southern half of its western edge. Its general extent and condition are as follows:

OYSTER GROWTH ON MOORES ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	37	265	9,805
Scattering	6	168	1,008
Total	43	.....	10,813

On the dense area the oysters, as developed by the survey, range between 134 and 351 bushels per acre, and it is estimated that the bottom as a whole will produce about 28 bushels of oysters per day of tonging.

The area of scattering growth lies in the deeper water close to the adjoining barren bottom, and its estimated yield to the tonger is about 8 bushels per day. The deposit of shells is good over the entire area of the bed.

DETAILS OF EXAMINATION OF MOORES ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
241	Aug. 20, 1909	9.5	Dense	33.4	35.4	0.0	351
265	Aug. 23, 1909	10.5	.....do	19.6	19.2	2.5	225
266	.....do	6.5	.....do	28.3	33.4	3.3	350
267	.....do	5.5	.....do	13.3	13.0	.0	134
242	Aug. 20, 1909	20.5	Scattering	10.4	12.5	.0	168

HORSEHEAD ROCK.

This bed covers several shoals along the edge of deep water south of Mulberry Point, and for the purpose of this report is considered to include a small patch close to the Baylor line to the eastward. The apex of the bed is detached, but the remainder is continuous, though of varying productiveness. East of this rock and north of Marshy Island Rock the survey found small patches of oysters close to the Baylor line, adjoining or included in various planted beds. This region is shown on the charts, included within red lines but without shading.

The general distribution of oysters on Horsehead Rock is as follows:

OYSTER GROWTH ON HORSEHEAD ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	33	223	7,359
Scattering	192	104	19,968
Very scattering	139	112	15,568
Depleted	16	0	0
Total	380	.....	42,895

The areas of dense growth are on the terminal isolated shoal and in two small patches on the main part of the bed. The growth varies between 178 and 283 bushels per acre, and it is estimated that the area as a whole will yield an average of 20 bushels per day to the tonger at the beginning of the season.

On the areas of scattering oysters the density of growth is between 47 and 170 bushels per acre, and it is estimated that they are capable of yielding, at the beginning of the season, an average of about 7 bushels per day per tonger.

On the bottom which is rated as carrying a very scattering growth the average per acre is slightly higher than on the preceding, but as the water is deeper it is less productive in its return per day of labor expended on it.

The depleted bottom lies inshore, close to Mulberry Point, and is practically, in many cases absolutely, bare of oysters and almost as deficient in shells. On all other areas the deposit of shells is good or fair.

DETAILS OF EXAMINATION OF HORSEHEAD ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
256	Aug. 23, 1909	14.0	Dense	19.3	35.4	0.4	283
257	.....do.....	7.0	.....do.....	16.5	22.7	.3	203
258	.....do.....	16.0	.....do.....	6.5	29.6	4.1	227
263	.....do.....	7.0	.....do.....	9.1	24.5	.6	178
255	.....do.....	18.5	Scattering	4.1	6.4	10.9	170
259	.....do.....	9.0	.....do.....	6.5	16.9	1.2	122
261	.....do.....	12.0	.....do.....	5.4	15.1	.5	110
262	.....do.....	7.0	.....do.....	8.0	5.9	.3	74
264	.....do.....	12.0	.....do.....	7.1	12.5	.4	104
273	Aug. 24, 1909	4.5	.....do.....	.4	5.6	1.1	47
260	Aug. 23, 1909	16.0	Very scattering	4.5	16.3	.5	112
274	Aug. 24, 1909	6.0	Depleted	.0	.0	.3	4
280	.....do.....	5.5	.....do.....	.0	.2	.0	1
291	.....do.....	5.0	.....do.....	.0	.0	.0	0
292	.....do.....	4.5	.....do.....	.0	.0	.0	0
293	.....do.....	5.0	.....do.....	.0	.0	.0	0
294	.....do.....	7.5	.....do.....	.0	.0	.0	0

DEEPWATER SHOALS ROCK.

This is considered as including all oyster bottoms within the Baylor lines above Mulberry Point. Its condition and extent are as follows:

OYSTER GROWTH ON DEEPWATER SHOAL ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	17	129	2,193
Very scattering	21	57	1,097
Depleted	241	12	2,892
Total	279	.....	6,182

The comparatively small productive area on this bed all lies within a radius of about 1,000 yards of Deepwater Shoals Light-House, most of it being in the immediate vicinity of the light. The dense area is in two small patches on which there is a sufficient growth to yield an average maximum of about 15 bushels per day of actual tonging.

The very scattering areas are three in number, all more or less intimately associated with the preceding. They should yield about 6 bushels per day at the beginning of the season.

The depleted area is practically devoid of oysters. On the areas of dense and very scattering growth there is a good covering of shells, and they are also found in ample numbers on the depleted area within a radius of 1,000 or 1,200 yards of the light, but elsewhere the bed is practically denuded.

The following examinations were made:

DETAILS OF EXAMINATION OF DEEPWATER SHOALS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
269	Aug. 23, 1909	4.0	Dense	4.6	12.6	0.3	91
270	.....do.....	9.0	.....do.....	2.1	12.9	5.8	138
285	Aug. 24, 1909	8.0	.....do.....	1.2	17.0	.9	158
272	Aug. 23, 1909	5.0	Very scattering	1.2	7.3	.0	44
284	Aug. 24, 1909	10.0	.....do.....	.0	.8	4.2	49
286	.....do.....	8.0	.....do.....	.0	7.7	3.3	74
288	.....do.....	7.0	.....do.....	.9	4.9	3.0	62
271	Aug. 23, 1909	6.0	Depleted	.3	2.9	.6	23
282	Aug. 24, 1909	5.0	.....do.....	.0	.2	.0	1
283	.....do.....	6.0	.....do.....	.3	1.5	.0	9
287	.....do.....	7.0	.....do.....	.7	2.2	.0	15

ROCK WHARF SHOALS ROCK.

This bed lies near the western end of Public Ground No. 1, Isle of Wight County, across the river from the group of seed beds previously described. It forms two patches surrounding shoals and consists principally of productive bottom, as shown in the following table:

OYSTER GROWTH ON ROCK WHARF SHOALS ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	18	140	2,520
Depleted	8	11	88
Total	26	.....	2,608

The dense area should yield an average of about 22 bushels of oysters per day, and is fairly covered with clean shells. The depleted bottom is practically bare of both oysters and shells.

DETAILS OF EXAMINATION OF ROCK WHARF SHOALS ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
421	Aug. 28, 1909	4	Dense	7.3	13.6	2.1	129
422	.....do.....	6	.....do.....	11.3	15.7	1.4	152
420	.....do.....	3	Depleted	.0	.2	.9	11

BEDS BETWEEN ROCK WHARF SHOALS AND SPINDLE ROCK.

These cover the largest area of productive bottom in the ground, distributed in three patches. Their aggregate area and extent are as follows:

OYSTER GROWTH ON BEDS BETWEEN ROCK WHARF SHOALS AND SPIND E ROCK.

Character of growth.	Area.	Oysters per acre.	Total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	45	140	6,300
Very scattering	5	46	230
Depleted	37	18	666
Total	87	.....	7,196

The dense areas are close to the shoal spots, and in various places bear from 101 to 178 bushels per acre, the average density being sufficient to yield about 22 bushels per day to the tonger.

The bottom of very scattering growth covers but a small spot at the outer end of the middle shoal, and the density of growth is sufficient to yield barely 5 bushels of seed oysters per day.

The depleted bottom is practically denuded. It bears very few shells, and the very scattering bottom is little better in this respect, but the shell deposit on the dense areas is good.

DETAILS OF EXAMINATION OF BEDS BETWEEN ROCK WHARF SHOALS AND SPINDLE ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
409	Aug. 28, 1909	4.0	Dense	8.6	18.2	1.0	147
417	.....do.....	6.0	.....do.....	17.0	10.0	.8	146
418	.....do.....	7.0	.....do.....	9.2	9.0	2.6	121
419	.....do.....	5.0	.....do.....	9.4	20.0	2.6	178
425	.....do.....	3.5	.....do.....	6.2	8.4	2.5	101
424	.....do.....	7.5	Very scattering	.5	3.1	2.6	46
410	.....do.....	6.5	Depleted	.3	1.3	1.3	22
416	.....do.....	7.0	.....do.....	.0	.3	1.3	15

SPINDLE ROCK.

This bed follows the line of a shoal at right angles to the shores. It consists principally of a dense growth, with insignificant areas of very scattering oysters and depleted bottom at its inner end. Its area and condition at the time of the survey were as follows:

OYSTER GROWTH ON SPINDLE ROCK.

Character of growth.	Area.	Oysters per acre.	Estimated total content of oysters.
	Acres.	*Bushels.*	*Bushels.*
Dense	14	140	1,960
Very scattering	3	27	81
Depleted	2	12	24
Total	19	.....	2,065

The dense area bears a growth of between 119 and 179 bushels per acre, and is capable of producing about 21 bushels of oysters per day's tonging; the area of very scattering growth will yield barely 5 bushels and the depleted bottom about 2 bushels. The area of dense growth bears a good supply of shells, that of very scattering growth hardly enough to insure reseeding except under the best conditions, while the depleted bottom is deficient.

The following examinations were made:

DETAILS OF EXAMINATION OF SPINDLE ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
415	Aug. 28, 1909	6.0	Dense	7.7	19.7	3.7	179
426	.....do.....	4.0	.....do	8.8	14.0	.4	120
427	.....do.....	6.0	.....do	7.4	13.6	1.1	119
411	.....do.....	4.0	Very scattering	1.3	2.6	.7	27
412	.....do.....	4.5	Depleted	.0	.9	.7	12

DAYS POINT SHOAL BED.

This follows a shoal but part of which is included in the public ground. The part included embraces a dense growth capable of yielding to the tonger about 27 bushels of oysters per day. The following is the result of the examination made:

DETAILS OF EXAMINATION OF DAYS POINT SHOAL ROCK.

Station number.	Date of examination.	Mean depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.
				Spat.	Culls.	Counts.	
		Feet.					*Bushels.*
413	Aug. 28, 1909	4.5	Dense	7.2	22.3	1.5	166

PUBLIC GROUNDS.

The public oyster grounds of Virginia are those areas of the bottoms of tide water which are included within the lines of the Baylor survey and additions thereto upon which the public is permitted to take oysters at certain seasons of the year on compliance with certain conditions, and which are withheld from lease for purposes of oyster culture under private and exclusive control.

The public grounds were designed to include all of the natural rocks, though, as has been explained previously, no actual examination was made for the purpose of really determining the facts. The boundaries are necessarily straight lines and do not purport to conform to the outlines of the actual rocks, and largely for this reason they can not fail to include within their confines more or less barren bottom. The relation which the barren bottoms bear to that which actually produces oysters has been in more or less acrimonious dispute between the tongers and dredgers on the one hand and the planters and their partisans on the other, and it was largely to secure authentic and definite information on this point that the present survey was undertaken.

The public grounds are officially designated by numbers and the name of the county within which they are supposed to lie, and on the accompanying charts their boundaries, accurately platted from the charts of the Baylor survey, are indicated by broken black lines. The boundaries of the natural rocks, as determined by the present survey, are shown in solid red lines, within which the varying density of oyster growth is shown by the relative density of the shading. An inspection of the charts will show that the natural rocks are more or less scattered, between and about them lying barren bottoms, shown as unshaded areas, within the boundaries of the Baylor survey.

At various places it was found that certain private grounds, as indicated by the boundary stakes, encroached more or less on the public grounds, though from the flimsy character of the marks it was difficult in many cases to determine the real facts. This apparent encroachment of private interests on the public domain was observed at various places in Nansemond River, between Fishing Point and Ballards Marsh, about Creek Channel Shoal and Aaron Shoal rocks, in the vicinity of Browns Shoal rocks, at the inshore edges of Kettle Hole and Blunt Point rocks, and at various places between Jail Island and Mulberry Point.

Whatever may have been the conditions under which this encroachment was originally permitted, it was undoubtedly aided by the latter-day uncertainty as to the Baylor boundaries. Apparently but little effort has been made to maintain or replace the shore marks to which the corners of the Baylor survey were referred, and a number of them appear to be now unavailable for reference. The irregularity of the boundaries has also made the maintenance of the lines more difficult, and the same conditions have made it almost impossible for the oyster police to prevent the planters from depredating the public beds beyond their staked boundaries.

These reasons have made it important to both "natural growthers" and planters that an examination should be made into the actual location of the productive areas or those which, though at present more or less unproductive, may be reasonably expected to recuperate under proper natural conditions.

To assist to an understanding of the conditions on the public beds as a whole the following discussion is offered. The several public beds in the region surveyed are considered with regard to the relative areas of dense, scattered, very scattered, and depleted growths, and barren bottom. The first four are measured from the results of the present survey, while the barren bottom is regarded as the difference between the sum of these areas and the areas of the public beds according to Baylor's computations, the data being exhibited in tabular form for each of the several public grounds. For each public ground or for each fraction or combination considered as an entity in the following pages, there are furnished tables and

summaries of the estimated total contents of market oysters, as distributed by rocks and varying densities of growth. These estimates are interesting, but are misleading if regarded as a measure of productiveness, for a very sparse growth over a large area, as compared with a dense growth over a small one, will give a great aggregate which really represents nothing commercially, as the oysters may be so thinly scattered as to be totally unavailable industrially.

The important point is not how many oysters there may be on a given bed at a given time, but the quantity of oysters available under existing local economic conditions, the maximum number of bushels that can be removed with profit to the tonger.

It is unnecessary to explain to those familiar with the oyster industry that it is practically impossible to accomplish a complete denudation of the beds in any one season, but there are cases known to the writer, though he has no personal knowledge of the kind in the region under discussion, in which small rocks have been, in effect, taken up bodily, oysters, seed, and shells, and transferred to planted beds.

Under ordinary circumstances, in localities where the cull laws can be and are reasonably enforced, not only the seed or young oysters but a considerable proportion of the market oysters are left on the beds at the end of the season. Eventually, however, the oysters become so scattered that the daily yield to the tonger becomes less than a minimum daily wage, and while the aggregate quantity of marketable oysters left on the beds appears large when expressed in a total of bushels, as in the tables of total contents, it will no longer pay to take them. The minimum average density of growth to which a bed may be reduced before becoming commercially unproductive depends primarily upon the price of oysters. The smaller the market value of a bushel of oysters the greater is the quantity that must be taken per day to furnish a living wage. Another factor that is essentially involved is the amount of culling required, less labor being necessary in handling the oysters when they are single or in small clusters than when they are badly clustered and overgrown with young, from which they must be separated before being placed on the market.

The depth of water is also a very important factor in determining the actual density of growth necessary to render a bed commercially productive. As has been explained in describing the methods pursued in the preparation of this report, the deeper the water the greater must be the quantity of oysters per square yard or acre necessary to afford the tonger a given catch per day. Not only do his tongs of any given length of shaft and head cover a smaller area on the bottom, but the time and labor of making the "grab"—that is, putting the tongs on the bottom, scraping up the oysters, and pulling them up—are materially increased. In other words, in deep water

not only is the area covered by a "grab" smaller, but, other things being equal, fewer "grabs" can be made in an hour than in a smaller depth.

In the tables shown in this report and on the chart these factors have all been considered in estimating the relative density of the beds. In the estimation of the available contents of the rocks as exhibited in the following tables the same factors have been considered. It is assumed that, at the price which has recently been received for market oysters in the region under consideration—namely, 45 cents per bushel—it would be wholly unprofitable to tong on bottoms which would yield less than 3 bushels of culled oysters per day, exclusive of the time spent in culling, which would ordinarily involve part of the time of a second man or boy. In the same way at the price of seed oysters, namely 30 cents per bushel, it is assumed to be equally unprofitable to tong on bottoms yielding less than 4 bushels, exclusive of shells.

It can not be argued that this limit is too high, but undoubtedly it will be claimed by some that it is entirely too low. The objection would be well founded if it were to apply wholly to areas on which the initial density of growth was such as to afford the minimum yield adopted, but it will not lie against the application of the standard to areas of greater initial productiveness. A dense bed in course of partial denudation by tonging is not uniformly depleted over its whole area. The tongers spread themselves more or less promiscuously over the rocks and take up practically all of the oysters in patches, while other areas are, for the time being, inadvertently left untouched. Later many of these untouched spots are tonged with profit, until the worked areas become so great in proportion to those which have been overlooked that the time spent in searching for the latter makes further work unremunerative. At this stage of temporary abandonment the rock consists of a few small patches of productive bottom, areas which are practically bare of market oysters, and others which have been worked over but still retain some oysters scattered over them by the operations of tonging. It is of course impossible, from the complexity and irregularity of the conditions obtaining on an oyster bed, to fix a limit of more than reasonable accuracy. In preparing the following tables the present available productiveness of each area has been considered with regard to the terms of its initial yield to the tonger and its total estimated contents above that which would give a return of 3 bushels per day's work on the market oyster beds and 4 bushels on the seed beds. The depleted areas and most of the areas covered by what is called very scattered growth are therefore negligible as present factors. A very few areas in the depleted bottoms and a somewhat greater proportion of the bottoms bearing a very scattering growth are of potential value as bearing small oysters and shells which reasonably assure future regeneration.

These are pointed out in the following discussion of the several public grounds:

PUBLIC GROUNDS NO. 2 NANSEMOND COUNTY AND NO. 6 ISLE OF WIGHT COUNTY.

These two grounds overlap, as platted on the state charts, and as they can not be accurately differentiated in the conflicting area they may be most conveniently considered together. The former bed begins at the upper limit of oyster growth in the Nansemond River off Cedar Point, and becoming continuous with No. 6 near Newport News Rock, the latter extends along the right side of the James River to beyond Ballards Marsh Rock. Ground No. 2 is said to contain 3,319.6 acres, and Ground No. 6, 4,148.2 acres, a total of 7,467.8; but there is an overlap or duplication of about 305 acres, and deducting this, the actual total area of the two beds may be assumed to be about 7,162.8 acres. The following is a résumé of the extent of the oyster bottoms of the several rocks and the barren bottom embraced within the limits of these grounds:

AREAS OF OYSTER GROWTH IN PUBLIC GROUNDS NO. 2 NANSEMOND COUNTY AND NO. 6 ISLE OF WIGHT COUNTY.

Name of oyster rock.	Oyster growth.				
	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Larkins	0	0	0	39	39
Nansemond Ridge	85	446	294	782	1,607
Drum Shoal	0	19	14	95	128
Newport News	4	27	12	129	172
Cruiser Shoal	27	19	26	32	104
Between Nansemond Ridge and Fishing Point [a]	50	0	5	7	62
High Shoal	24	13	24	95	156
Trout Shoal	0	25	14	90	129
Dog Shoal	16	11	35	120	182
Fishing Point	45	77	47	90	259
Between Fishing Point and Ballards Marsh	5	0	8	18	31
Ballards Marsh	0	4	33	142	179
Total oyster area	256	641	512	1,639	3,048
Total barren bottom					4,114.8
Total Baylor survey					7,162.8

[a] 8 acres undetermined.

It will be observed from this table that the barren bottom, as developed by this survey, exceeds the area of the oyster rocks and constitutes about 57 per cent of the area of the two public grounds under discussion. The depleted bottom, which, excepting the places noted in the detailed descriptions of the several beds, is at present unproductive and of a character that gives little or no promise of future regeneration, forms about 23 per cent of the total area included within the Baylor lines. Assuming that the areas of very scattering

growth, at present practically worthless so far as actual productiveness is concerned, are capable of coming into production at some time in the future, by virtue of the young growth and clean shells that they bear, it will be seen that the actual productive oyster rocks form only about 20 per cent of the area of these two public grounds.

The estimated total marketable contents of the grounds, based upon the distribution of oysters, as indicated by the chain, and the actual productiveness of the various areas as determined by actual count and measurement, is exhibited in the following table:

CONTENT OF MARKET OYSTERS, PUBLIC GROUNDS NO. 2 NANSEMOND COUNTY AND NO. 6 ISLE OF WIGHT COUNTY.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Larkins	.....	.....	.....	195	195
Nansemond Ridge	7,905	26,760	10,878	8,602	54,145
Drum	.....	950	546	2,755	4,251
Newport News	432	1,701	420	3,483	6,036
Cruiser Shoal	4,212	1,007	728	288	6,235
Flat Rock, etc	5,400	.....	210	182	5,792
High Shoal	2,160	624	600	807	4,191
Trout Shoal	.....	1,100	420	720	2,240
Dog Shoal	1,664	507	945	1,416	4,532
Fishing Point	5,355	6,314	2,068	1,710	15,447
Between Fishing Point and Ballards Marsh	1,340	.....	248	.....	1,588
Ballards Marsh	.....	124	792	894	1,810
Total	28,468	39,087	17,855	21,052	106,462

This indicates that if it were possible to "clean up" completely the entire area covered by the oyster rocks, the product would be about 106,000 bushels of marketable oysters. When an analysis is made, it is speedily apparent that the commercially available supply on these beds is only about 40 per cent of the foregoing, as stated in the following table:

AVAILABLE CONTENT OF MARKET OYSTERS, PUBLIC GROUNDS NO. 2 NANSEMOND COUNTY AND NO. 6 ISLE OF WIGHT COUNTY.

Name of rock.	Dense.	Scattering.	Very scattering.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Larkins	.....	.....	.....	.....
Nansemond Ridge	5,500	13,500	1,000	20,000
Drum	.....	400	100	500
Newport News	350	850	.....	1,200
Cruiser Shoal	3,400	700	.....	4,100
Flat Rock, etc	3,600	.....	.....	3,600
High Shoal	1,500	350	100	1,950
Trout Shoal	.....	600	.....	600
Dog Shoal	1,200	250	.....	1,450
Fishing Point	4,400	3,600	300	8,300
Between Fishing Point and Ballards Marsh	1,200	.....	.....	1,200
Ballards Marsh	.....	75	100	175
Total	21,150	20,325	1,600	43,075

It will be observed that on the basis assumed in this report the depleted areas are wholly unproductive commercially, and the bottoms covered with very scattered growth are practically so. On the latter the growth in many cases is barely sufficient to yield 3 bushels per day, and in no case does it much exceed that limit. The large aggregate of market oysters on the areas of very scattered and depleted bottoms are so thinly distributed as to be unavailable commercially, and are therefore valueless except as brood stock to assist in furnishing spat for replenishing the beds. On the dense areas about three-fourths of the total contents and on the scattering growths about one-half may be taken with profit.

The total estimated available product of 43,075 bushels appears very small as compared with the area included within the Baylor lines, averaging but about 6 bushels per acre. It is about half of the average yield of marketable oysters on the public grounds of the State as a whole in 1901 and 1904, according to the statistics of the Bureau of Fisheries, and about equal to the average yield in 1908, as stated by the Bureau of the Census.

The deficiency in productiveness of this section was to be expected in view of public report. The beds, especially in Nansemond River, are generally recognized as being seriously depleted, the allegation of the tongers being that several years ago large quantities of unculled stock were taken from the beds for deposit on private planting ground, and the tonger employed by the survey is authority for the statement that the growth on the Nansemond River beds in the season preceding the investigation was hardly sufficient to warrant tonging.

Combining the exhibits of the tables of areas and of commercially available oysters, we find that it apparently would be profitable to take from the dense growths about 83 bushels per acre and from the scattering growths an average of about 32 bushels. On the bottoms with a very scattering growth the average content per acre at the beginning of the present oyster season was so small that, even under the very low standard of profit adopted in this report, the beds would be reduced to unproductiveness after an average of only about 3 bushels of oysters per acre had been removed. Of course a very large part of this bottom must be regarded as practically unproductive in the beginning, and it is only here and there that even the least ambitious tonger would venture to work.

Another aspect of the present state of these grounds is the production of young oysters and the presence of shells in such quantities and cleanliness as to afford prospect of a strike under proper conditions. The following table gives the estimated total content of the several rocks and of the grounds as a whole in oysters less than 3 inches long:

TOTAL CONTENT OF YOUNG OR SEED OYSTERS, PUBLIC GROUNDS NO. 2 NANSEMOND COUNTY AND NO. 6 ISLE OF WIGHT COUNTY.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*
Larkins				390	390
Nansemond Ridge	12,580	59,318	9,996	27,370	109,264
Drum		1,748	854	5,890	8,492
Newport News	372	2,025	996	4,386	7,779
Cruiser Shoal	3,780	893	1,326	2,112	8,111
Flat Rock, etc	150		275	112	537
High Shoal	3,216	1,651	1,392	760	7,019
Trout Shoal		4,112	1,652	1,890	7,654
Dog Shoal	2,480	1,989	770	4,838	10,077
Fishing Point	8,325	13,706	3,290	2,700	28,021
Between Fishing Point and Ballards Marsh	915	0	0	0	915
Ballards Marsh		608	6,303	6,590	13,501
Total	31,818	86,050	26,854	57,038	201,760

In individuals the small oysters are five or six times as numerous as the market oysters and in measured quantity they are about twice as abundant. On the dense areas they bulk about the same as the market oysters, but as individuals they are two or three times as many. On the scattered area they much exceed the market oysters in numbers and are more than double them in measured quantity. As both of these types of bottom are almost invariably supplied with cultch in the form of clean shells, it can be safely assumed that their future is assured under ordinarily fair conditions and provided the beds are not stripped under infractions of the culling law.

On the area of very scattering growth the quantity of young in nearly every case materially exceeds that of market oysters. Almost the sole exception is Nansemond Ridge Rock, where the young and market oysters are about equal in quantity, the former being decidedly deficient in all places excepting close to the denser areas below a line between Pig and Barrel Points.

Excepting Nansemond Ridge Rock the very scattering areas bear an average of about two and one-half times as many bushels of young as of old oysters per acre, and there is nearly everywhere a sufficient abundance of shells to justify the prediction of future regeneration if man will permit. On Nansemond Ridge the future of the very scattering areas, except in a few places, appears unpromising.

The depleted area is, on the whole, deficient in shells and young oysters, and if we except one or two spots near Nansemond Light, the outer end of Ballards Marsh Rock, and several other places quite close to the productive areas, there is but little probability that any of the area will become naturally productive.

PUBLIC GROUND NO. 1 WARWICK COUNTY, BELOW DEEP CREEK.

This public ground, while continuous in its lines from near Newport News to above Deepwater Shoals Light, is divided, for purposes of administration, by a line running from Deep Creek to Days Point. Below this line the cull law is in force and tonging is practically confined to taking oysters for the market, while above the line it is legally permissible to take oysters of all sizes for planting purposes. The total area of the portion of the bed here discussed is about 5,515 acres. It embraces six well-defined rocks or groups of rocks, the general condition and area of which are shown in the following table, which also includes a very small contiguous and overlapping area at the inshore edge of Kettle Hole Rock, known as Public Ground No. 2 Warwick County:

AREAS OF OYSTER GROWTH, PUBLIC GROUND NO. 1 WARWICK COUNTY, BELOW DEEP CREEK.

Name of oyster rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Browns Shoal	68	44	27	226	365
Gun Shoal	6	0	16	4	26
Kettle Hole	258	66	111	11	446
Thomas Point	76	118	100	127	421
Blunt Point	16	69	225	118	428
White Shoal	44	0	10	52	106
Total oyster area	468	297	489	538	1,792
Total barren bottom	.....	.....	.....	.....	3,723
Total Baylor survey	.....	.....	.....	.....	5,515

As shown above, the barren bottom is equal to about 68 per cent of the area included within the Baylor lines, while the depleted area, which is almost uniformly worthless in its present condition, is equal to about 10 per cent. Assuming, as has been done in the discussion of the preceding grounds, that the bottom bearing a very scattering growth, of little or no present value so far as its market-oyster content is concerned, is capable of regeneration under the operation of natural agencies, the total present or prospective productive bottom constitutes about 22 per cent of the entire area. The following table shows the estimated present market-oyster content of the several rocks and their respective subdivisions according to density of growth:

CONTENT OF MARKET OYSTERS, PUBLIC GROUND NO. 1 WARWICK COUNTY, BELOW DEEP CREEK.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Browns Shoal	12,444	2,376	1,053	904	16,777
Gun	912	.....	480	.....	1,392
Kettle Hole	27,090	5,412	4,662	.....	37,164
Thomas Point	8,745	8,378	5,100	2,667	24,890
Blunt Point	2,576	4,140	10,125	1,652	18,493
White Shoal	5,588	.....	360	624	6,572
Total	57,355	20,306	21,780	5,847	105,288

The total content is nearly equal to that of the two grounds first described, but it will be observed that it is differently distributed, the dense areas bearing about twice the quantity of marketable oysters, the scattering about half as many, the very scattering about one-third more, and the depleted about three-fourths the quantity. With the exception of the depleted bottom, the average growth per acre is in each case somewhat greater than upon the grounds on the opposite side of the James and in the Nansemond River.

As will be understood from what has gone before, this distribution of the total content is to the distinct advantage of the oysterman, as a larger proportion of the oysters may be removed before work on the beds becomes unremunerative. The estimated available content of the beds embraced within this part of the public grounds—that is, the probable maximum yield during the present season—is shown in the following table:

AVAILABLE CONTENT OF MARKET OYSTERS, PUBLIC GROUND NO. 1 WARWICK COUNTY, BELOW DEEP CREEK.

Name of rock.	Dense.	Scattering.	Very scattering.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Browns Shoal	9,800	1,200	250	11,250
Gun	600	.....	.....	600
Kettle Hole	18,900	2,700	800	22,400
Thomas Point	6,000	4,200	500	10,700
Blunt Point	2,000	2,000	2,000	6,000
White Shoal	4,000	.....	.....	4,000
Total	41,300	10,100	3,550	54,950

Practically four-fifths of the available oysters are found on the areas charted as bearing a dense growth, and about two-thirds of the remainder are on the areas of scattering growth. The bottoms covered by oysters in very scattering growths are slightly more productive than the average of the grounds previously described, but there are comparatively few spots on which a tonger could make a minimum livelihood. It is estimated that on the dense areas as a whole nearly three-fourths of the total content, on the scattering areas

about one-half, and on the very scattering areas not over one-sixth could be removed with profit. The depleted bottoms are worthless for their present product of market oysters.

The yield per acre of bottom included within the Baylor lines is considerably greater than on the grounds previously described, the average being almost 10 bushels, 2 bushels less than the average of the entire public area of Virginia in 1904, and considerably more than the average reported by the Census Bureau in 1908. The average available product of the oyster rocks, excluding all barren bottom but not that which it depleted, is about 30 bushels per acre. The average of the dense area is about 88 bushels, of the scattering area 34 bushels, and of the very scattering growth about 7 bushels per acre. The rocks in this ground are, on the whole, so far as present productiveness is concerned, in better condition than those across the river. The probable future productiveness of the beds, so far as the present existence of young oysters is concerned, is illustrated in the following table:

TOTAL CONTENT OF YOUNG OR SEED OYSTERS, PUBLIC GROUND NO. 1 WARWICK COUNTY, BELOW DEEP CREEK.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Browns Shoal	8,568	6,248	2,376	1,130	18,322
Gun	1,188	.....	992	.....	2,180
Kettle Hole	81,786	13,662	19,980	.....	115,428
Thomas Point	12,768	20,060	10,300	10,160	53,288
Blunt Point	2,736	13,317	23,625	4,956	44,634
White Shoal	14,728	.....	1,080	2,756	18,564
Total	121,774	53,287	58,353	19,002	252,416

The exhibit here is much more favorable than on the rocks included in the grounds previously described, the average growth of young oysters on the dense and very scattering areas being over double that on the beds across the river, while that on the scattering area is about 35 per cent greater.

Practically everywhere on the areas of dense and scattered growth there is a prolific growth of young oysters and an abundance of clean shells, and there is no present prospect of the failure of these areas to continue to produce marketable oysters under ordinary conditions and with a reasonable enforcement of the laws. On the areas of very scattering growth the conditions are mixed, some places being well insured against the future and others being decidedly deficient in both young growth and clean shells. On Browns Shoal Rocks there is, with the exception of a few places, an abundance of shells; but there are only two or three patches where there is a supply of small oysters ample to replace the present market growth. On Kettle Hole Rock the conditions are good practically everywhere, but on Thomas Point and

Blue Point Rocks there are but a few places where the young growth is prolific, and there are some in which neither young nor shells are found in even the minimum quantity requisite. On White Shoal Rock the condition on the areas of very scattering growth is in general satisfactory.

On the depleted bottoms as a whole the average growth of young oysters is about equal to that on similar bottom across the river, and there appears to be but little prospect of the future improvement of these areas, although there are a few spots on Thomas Point and White Shoal Rocks, in proximity to productive areas, where the growth of young is good.

MINOR PUBLIC GROUNDS.

In the Nansemond River and on the right side of James River there are several small public grounds, all of which are insignificant both in area and productiveness, and some of which were examined not at all or unsatisfactorily. They are as follows (somewhat more detailed data concerning some of them may be found in the descriptions of the individual rocks):

Nansemond County Ground No. 3. This was intended to include Holland Rock and at present contains in depleted bottom about 22 acres, on which there are a very few oysters and shells and about 33.9 acres of barren bottom.

Isle of Wight County Ground No. 2 contains about 9 acres of bottom of various degrees of productiveness, 24 acres of depleted and 16.8 acres of barren bottom. Its general condition is related in the description of Aaron Shoal Rock, its only natural bed. Isle of Wight County Ground No. 3 adjoins the preceding and has an area of 6½ acres. It was not examined in the present survey. Isle of Wight County Ground No. 4 lies inshore of the preceding and covers about 3 acres of apparently depleted bottom.

Isle of Wight County Ground No. 5 embraces Creek Channel Shoal Rock, covering about 2 acres of depleted and 5.1 acres of barren bottom. Its present condition is described under the name of the rock.

PUBLIC GROUND NO. 1 WARWICK COUNTY, ABOVE DEEP CREEK.

The lower part of this ground, lying below Deep Creek, is within the area from which market oysters only can be taken and is therefore subject to the operations of the cull law. Its beds have been discussed in the foregoing. Above Deep Creek and Days Point, on both sides of the river, the cull law is suspended so far as young oysters are concerned, and, while shells must be returned to the beds, there is no limit on the minimum size of oysters which may be taken, the whole area being set apart for the production of seed for replanting.

It is necessary, therefore, in the discussion of the productiveness of this part of the James River oyster grounds, to adopt a different standard of productiveness. The whole oyster product of whatever size is involved in the question of the present value of the beds, whereas in the areas previously discussed the market oysters only could be considered, and the quantity of young was of interest merely as indicating the probability of the beds being maintained or repleted. In the discussion which follows here the maximum potential yield is considered as the production in excess of that which will give the tonger 4 bushels of oysters per day of tonging, not taking into consideration the time employed in culling out the shells and returning them to the beds.

This part of Ground No. 1 includes all oyster rocks on the left bank of the James River, from the mouth of Warwick River to the upper limit of oyster growth, near Deepwater Shoals Light-House. The following is a summary of the extent of the several rocks and the barren bottoms embraced within the Baylor lines:

AREAS OF OYSTER GROWTH, PUBLIC GROUND NO. 1 WARWICK COUNTY, ABOVE DEEP CREEK.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Jail Island	227	198	14	508	947
Wreck Shoal	586	0	0	0	586
Dry Shoals	126	18	9	21	174
Point of Shoals	254	155	239	142	790
Swash	146	0	0	115	261
Mulberry Swash	422	34	20	29	505
Marshy Island	197	322	235	387	1,141
Long Shoal	331	10	84	79	504
V Rock	240	0	73	73	386
Moores	37	6	0	0	43
Horsehead	33	192	139	16	380
Deepwater Shoals	17	0	21	241	279
Total oyster area	2,616	935	834	1,611	5,996
Total barren area					6,896.8
Total Baylor survey					12,892.8

It will be noticed at once that the proportion of barren bottom to that actually included in the rocks as determined by the survey is somewhat smaller than in the grounds previously discussed, constituting about 53 per cent of the total. The depleted bottom, which, with practically no exceptions, is at present and potentially valueless, covers an additional 12 or 13 per cent, so that, assuming all the rest to be at present productive or capable of becoming so in the future, the oyster bottom covers about 35 per cent of the whole.

The following table exhibits the estimated total content of the several rocks and their subdivisions at the opening of the oyster season on September 15, 1909:

TOTAL CONTENT OF OYSTERS, PUBLIC GROUND NO 1 WARWICK COUNTY, ABOVE DEEP CREEK.

Name of rock	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Jail Island	32,461	21,582	392	4,064	58,499
Wreck Shoal	185,176	.....	.....	.....	185,176
Dry Shoals	30,766	2,232	765	420	34,183
Point of Shoals	50,800	14,415	10,038	2,130	77,383
Swash	42,778	.....	.....	1,725	44,503
Mulberry Swash	127,444	3,604	2,600	1,247	134,895
Marshy Island	45,507	41,538	19,975	6,966	113,986
Long Shoal	79,771	640	5,040	1,264	86,715
V Rock	54,480	.....	6,132	1,095	61,707
Moores	9,805	1,008	.....	.....	10,813
Horsehead	7,359	19,968	15,568	.....	42,895
Deepwater Shoals	2,193	.....	1,097	2,892	6,182
Total	668,540	104,987	61,607	21,803	856,937

It will be seen that the great preponderance of oyster production is on the dense areas, which exceed the bottoms of other character not only in their average productiveness but in their total area. The bottoms with a scattering growth, which in extent exceed the next lower grade by about 12 per cent, excel them in their total content by about 70 per cent, and are considerably more important in total production than the combined areas of very scattering oysters and depletion. Summarizing, the dense areas bear 78 per cent of the total content of the rocks, the scattering areas about 12 per cent, the very scattering about 7 per cent, and the depleted bottom about 3 per cent. Basing the computation on the basis previously defined and the data presented in the preceding two tables, we find the estimated maximum available product of the several rocks and their subdivisions to be as follows:

AVAILABLE CONTENT OF OYSTERS, PUBLIC GROUND NO. 1 WARWICK COUNTY, ABOVE DEEP CREEK.

Name of rock.	Dense.	Scattering.	Very scating.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Jail Island	25,000	12,000	100	37,100
Wreck Shoal	160,000	.....	.....	160,000
Dry Shoals	26,000	1,300	.....	27,300
Point of Shoals	42,000	8,500	1,000	51,500
Swash	38,000	.....	.....	38,000
Mulberry Swash	116,000	1,800	1,000	118,800
Marshy Island	35,000	25,000	7,500	67,500
Long Shoal	68,000	300	1,500	69,800
V Rock	44,000	.....	2,500	46,500
Moores	7,500	.....	500	8,000
Horsehead	6,000	11,000	7,000	24,000
Deepwater Shoal	1,600	.....	400	2,000
Total	569,100	59,900	21,500	650,500

The foregoing may be assumed to be the maximum quantity of seed oysters that can be profitably taken from the beds during the present season and the actual yield will probably fall considerably below the total exhibited in the table. Of the total, the areas of dense growth are capable of producing 88 per cent, of scattering growth 9 per cent, and of very scattering growth 3 per cent. The estimated yield per acre of bottom included within the boundary lines of this part of the bed is about 50 bushels. This low average of production is of course induced by the large area of barren and depleted or practically barren bottom included in the Baylor lines. If we compare the average of the whole area with that of the best bottom in the natural rocks under discussion the paucity of the former is equally impressive, the dense areas of the region under discussion having an average total content of about 256 bushels per acre and a promised yield during the present season of 213 bushels, over four times the average of the beds as a whole. The average available product of the areas of scattering growth is about 64 bushels per acre, and of very scattering growth about 13 bushels, both yields being far below what they should produce under proper conditions.

Upon the dense areas as a whole the present production and the promise for the future are both good, and on the area of scattering growth, while the present production is fair, the quantity of shells is such as to promise a better yield in the future, should there come a season of heavy and general strike.

On the bottoms rated as bearing a very scattering growth the conditions as a whole are not such as to yield much profit to the tonger, though in some places he could make a living wage for a short period. In most places on bottom of this character the quantity of clean shells is such as to give indifferent prospect of the future regeneration of the beds.

The depleted bottom, excepting in a few places near Deepwater Shoals Light-House, bears shells in such small quantities as to make exceedingly remote the probability of any material improvement under natural conditions.

PUBLIC GROUND NO. 1 ISLE OF WIGHT COUNTY.

This ground extends as a narrow strip along the right bank of James River from close to the shore line out to the main channel, between Rock Wharf and Days Point Shoal. It lies wholly within the area set apart for seed production, and the statements in regard to the methods employed in computing the productiveness of the several parts of the preceding ground are applicable to this as well.

Compared with the extensive areas occupied by the rocks across the river in Warwick County, the beds included in this ground are

insignificant. For the purposes of this report it is considered to include four natural rocks, although the largest of these, for which no name was obtained from the oystermen, may be locally recognized by names for its constituents severally. The general condition and extent of the bed are shown in the following table:

AREAS OF OYSTER GROWTH, PUBLIC GROUND NO. 1 ISLE OF WIGHT COUNTY.

Name of oyster rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Rock Wharf Shoals	18	0	0	8	26
Between Rock Wharf and Spindle Rock	45	0	5	37	87
Spindle	14	0	3	2	19
Days Point Shoal	4	0	0	0	4
Total oyster area	81	0	8	47	136
Total barren area	.....	.....	.....	.....	589
Total Baylor survey	.....	.....	.....	.....	725

The area of barren bottom as compared with the extent of the ground is relatively large, constituting about 81 per cent, and the depleted bottom, which is at present worthless and holds forth no promise of improvement, adds an additional 7 per cent to the wholly unproductive bottom. The area of dense growth, which is undoubtedly productive, covers about 11 per cent of the whole, while the bottom bearing very scattered oysters, which is at present practically incapable of yielding a living wage to the tonger, covers about 1 per cent.

The following table shows the estimated total content of oysters on the rocks at the end of August, 1909:

TOTAL CONTENT OF OYSTERS, PUBLIC GROUND NO. 1 ISLE OF WIGHT COUNTY.

Name of rock.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Rock Wharf Shoals	2,520	.....	.....	88	2,608
Between Rock Wharf Shoals and Spindle Rocks	6,300	.....	230	666	7,196
Spindle	1,960	.....	81	24	2,065
Days Point Shoal	664	.....	.....	.....	664
Total	11,444	.....	311	778	12,533

The total content of the ground as a whole averages about 17 bushels per acre. Practically all of this is borne by the small fraction of the bottom classed as dense, on which the average production is at the rate of about 141 bushels per acre, considerably less than on the areas of dense growth on the great beds across the channel.

The estimated available content on these beds—that is, the quantity which may be removed before tonging will cease to pay even a very small assumed minimum livelihood—is as follows:

AVAILABLE CONTENT OF OYSTERS, PUBLIC GROUND NO. 1 ISLE OF WIGHT COUNTY.

Name of rock.	Dense.	Scattering.	Very scattering.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Rock Wharf Shoals	2,000	.....	.....	2,000
Between Rock Wharf Shoals and Spindle Rock	5,000	.....	50	5,050
Spindle	1,500	.....	20	1,520
Days Point	500	.....	.....	500
Total	9,000	.....	70	9,070

Practically all of the available supply of oysters on this ground is therefore on the bottom classed as dense and the area of very scattering growth is negligible. The available product is of the average density of 111 bushels per acre. On the dense area the shells are sufficient, on the very scattering area they are in fair quantity, while on the depleted ground they are deficient.

SUMMARY.

The public grounds in the region covered by the survey and of which a detailed discussion is found in the preceding pages cover an area of 26,408.4 acres as computed in the report of the Baylor survey. Of this acreage, 12,790.6 acres lie below the line drawn between Deep Creek and Days Point and 13,617.8 acres lie above that line. The beds of the former region are available for the production of marketable oysters only, the law requiring that all oysters under 3 inches long be returned to the beds, while the latter region is set apart for the production of seed oysters, and the cull law is not applicable except in so far as it forbids the removal of shells.

Of the entire area the recent survey shows that 3,227 acres may be classed as bearing a dense growth, 2,078 as scattering, 1,848 as very scattering, 3,884 as depleted, and 15,371.4 as barren. The barren and depleted bottoms together comprise 19,255.4 acres, or about 73 per cent of the total, and all bottom which can be construed as productive aggregates 7,153 acres, or 27 per cent of the entire bottom included within the Baylor lines. Owing to the difference in the provisions of the law applicable to the two regions and the resultant difference in the character of their product, it is necessary to present separate summaries of their present condition.

MARKET OYSTER AREA.

The beds of this region are shown on chart 1 accompanying this report, to which, and to the preceding pages, readers are referred

for detailed data. The following table summarizes the extent and character of the bottom included within the Baylor lines:

SUMMARIZED STATEMENT OF MARKET OYSTER AREAS ON PUBLIC GROUNDS.

Name of ground.	Dense.	Scattering.	Very scattering.	Depleted.	Barren.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Nansemond No. 2 / Isle of Wight No. 6	256	646	514	1,640	4,106.8	7,162.8
Nansemond No. 3	0	0	0	22	33.9	55.9
Isle of Wight No. 2	2(?)	4	3	24	16.8	49.8
Isle of Wight No. 3						
Isle of Wight No. 4						
Isle of Wight No. 5	0	0	0	2	5.1	7.1
Warwick No. 1 and No. 2 (below Deep Creek)	468	297	489	538	3,723.0	5,515.0
Total	726	947	1,006	2,226	7,885.6	12,790.6
Per cent	5.7	7.4	7.9	17.4	61.6	100.0

It is estimated that the bottoms embraced by the several grounds, classified in accordance with their relative productiveness, have a total content of market oysters as follows:

SUMMARIZED CONTENT OF MARKET OYSTERS ON PUBLIC GROUNDS.

Name of ground.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Nansemond No. 2 / Isle of Wight No. 6	28,468	39,087	17,855	21,052	106,462
Nansemond No. 3				330	330
Isle of Wight No. 2	200	132	69	132	533
Isle of Wight No. 3					
Isle of Wight No. 4					
Isle of Wight No. 5				22	22
Warwick No. 1 and No. 2 (below Deep Creek)	57,355	20,306	21,780	5,847	105,288
Total market oysters	86,023	59,525	39,704	27,383	212,635
Average per acre	118	63	39	12	
Per cent of total	40.3	28.0	18.7	13.0	100

This table is more or less misleading, as the real factor involved is the quantity of oysters which can be profitably removed from the beds. It must be obvious that the total quantity lying on the bottom can not be regarded as commercially available, for when the density of growth is reduced below a more or less definite minimum the value of the average catch will fall below a minimum living wage and work will cease. The minimum average quantity per unit of bottom which will suffice to support commercial operations will depend upon the price of oysters and the depth of water. In this report the price is placed at 45 cents per bushel, and although it will vary somewhat on the different beds and at different times, it is not practicable to make distinctions. The price adopted is based on the testimony of a number of oystermen as to their returns in recent years. The depth of water is a highly variable factor, and as it is of prime importance in

computing the availability of the oysters lying on the bottom, its variations have been given the fullest possible consideration. For a discussion of the general principles on which the quantity of oysters available with profit have been determined, the reader is referred to preceding pages. For the market oyster beds as a whole the following table gives a summary:

SUMMARY OF AVAILABLE CONTENT OF MARKET OYSTERS ON PUBLIC GROUNDS.

Name of ground.	Dense.	Scattering.	Very scattering.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Nansemond No. 2 Isle of Wight No. 6	21,150	20,325	1,600	43,075
Nansemond No. 3				
Isle of Wight No. 2	150	50		200
Isle of Wight No. 3				
Isle of Wight No. 4				
Isle of Wight No. 5				
Warwick No. 1 and No. 2 (below Deep Creek)	41,300	10,100	3,550	54,950
Total available market oysters	62,600	30,475	5,150	98,225
Average per acre	86	32	5	
Per cent	63.7	31.0	5.3	100.0

This may be regarded as a maximum estimate of the probable yield of the beds during the season of 1909–10. Owing to the low basis adopted as a minimum wage the yield may not reach the quantity indicated, as it is doubtful whether the beds can be profitably fished as closely as has been assumed. A yield of $1.35 per full day of tonging will leave a very small balance after culling and other expenses are deducted, and the beds undoubtedly will be abandoned for the season before this degree of depletion has been reached. For this reason the only parts of the natural rock which can be classed as really productive are those designated as dense and scattering, which furnish, according to the foregoing estimates, about 95 per cent of the available product while constituting only about 13 per cent of the total area of the public grounds under consideration.

Taken as a whole, though there are exceptions noted in the preceding accounts of the individual rocks, the areas covered with very scattering growths are of but little present value, their total estimated available product during the present season being valued at less than $2,500, or about $2.50 per acre. There is, however, another phase to the question which has been touched on in the more detailed accounts of the individual rocks. This is the possibility of future improvement, and is dependent upon the existing quantity of young oysters and the presence of an ample supply of clean shells to serve as places of attachment for future generations of young. The quantity of young oysters less than 3 inches long on the public grounds under discussion at the opening of the present oyster season was as follows:

SUMMARIZED CONTENT OF YOUNG OYSTERS ON PUBLIC GROUNDS.

Name of ground.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Nansemond No. 2	31,818	86,050	26,854	57,038	201,760
Isle of Wight No. 6					
Nansemond No. 3				50	50
Isle of Wight No. 2	250	500		2,500	3,250
Isle of Wight No. 3					
Isle of Wight No. 4					
Isle of Wight No. 5					
Isle of Wight No. 6					
Warwick No. 1 and No. 2 (below Deep Creek)	121,774	53,287	58,353	19,002	252,416
Total	153,842	139,837	85,207	78,590	457,476
Average per acre	212	148	84	35	
Per cent	33.7	30.6	18.6	17.1	100.0

Here again is evidence that the areas of dense and scattering growth should be regarded as not only at present but prospectively productive beds. In quantity, and to a greater extent numerically, the young are considerably in excess of the market oysters, and, as in both classes of bottom under consideration the latter are sufficient to render the bottom undoubtedly at present productive, the abundance of young is sufficient to continue productiveness, under proper regulations as to culling, for at least two years. After the lapse of that period the condition will depend upon the extent of the strike, and other factors concerning which nothing can be predicted.

So far as the areas covered with a very scattering growth are concerned closer scrutiny is required. As these bottoms are on the verge of depletion in respect to market oysters, the proportion of young to large oysters should be greater to insure that the conditions will improve in the future.

The writer is not in possession of definite experimental data applicable specifically to the James River, but from a knowledge of conditions in other parts of the Chesapeake region he feels justified in assuming that oysters as an average will become fit for market in from two to three years from the time of fixation or setting. If experience elsewhere be a guide, some oysters will grow more rapidly and some less rapidly; but two years may be adopted, with very little question, as an irreducible minimum for the average age at which they can be advantageously put on the market. On this assumption and neglecting, for the time being, the question of mortality, it is at once apparent that to maintain the present status there must be two small oysters for each market oyster killed or caught.

There is no way to determine, without long and painstaking observations, the actual average mortality at various ages on the natural rocks of James River. The experience of planters of seed oysters is valueless in this connection, being based on oysters handled and

otherwise subjected to abnormal conditions. The various locations of the natural-bed oysters and the consequently variable conditions to which they are exposed introduce a factor for which it is difficult to make allowances, and it seems impossible to do more than hazard a guess as to the proportion of young oysters now on the beds which will die before becoming marketable. It is probable that it will be somewhere between 25 and 50 per cent. Considering the size of young oysters found by the survey, the mortality may be less than the former and excepting under unfavorable conditions can hardly be greater than the latter. Assuming that 25 per cent of the young now on the beds will die before reaching a marketable size, there should be on the beds, in order to maintain their present condition, 2.66 young for each marketable oyster removed. If the loss be assumed at 50 per cent there should be 4 young per market oyster.

The following table exhibits the actual average numerical proportion of young oysters to marketable found on the several beds:

NUMERICAL PROPORTION OF YOUNG GROWTH AND MARKET OYSTERS IN THE MARKET-OYSTER AREA ON BOTTOMS BEARING VERY SCATTERING GROWTH.

Name of rock.	Oysters less than 1 inch long.	Oysters between 1 and 3 inches.	Total.
Nansemond Ridge	0.42	1.82	2.24
Drum Shoal	.62	3.29	3.91
Newport News	.50	5.27	5.77
Cruiser Shoal	.55	3.83	4.38
Flat Rock, etc	.69	2.58	3.27
High Shoal	1.81	2.47	4.28
Trout Shoal	.55	6.81	7.36
Dog Shoal	.27	1.13	1.40
Fishing Point	1.11	1.94	3.05
Between Fishing Point and Ballards Marsh	.06	.00	.06
Ballards Marsh	3.50	11.40	14.90
Aaron Shoal	.66	8.00	8.66
Browns Shoal	.80	4.00	4.80
Gun	.19	4.28	4.47
Kettle Bottom	.63	8.27	8.90
Thomas Point	.21	4.06	4.27
Blunt Point	.35	4.56	4.91
White Shoal	.87	5.36	6.23
Average	.76	4.39	5.15

It will be observed that on the assumption of the smaller death rate, Nansemond Ridge, Dog Shoal, and the small beds near Ballards Marsh are the only rocks which appear to lack sufficient young growth on the very scattering areas to maintain them in their present condition. Assuming the higher rate of mortality, Drum Shoal, the small bed near Flat Rock, and Fishing Point Rocks must be added to the list, though when we consider that many of the market oysters now on the bottom can not be taken with profit, it would appear that even these rocks are capable of improving under a rigid observance of the cull law. The other rocks, under either assumption as to mortality, probably bear a sufficient number of young to

maintain their present condition or to cause slight improvement in their productiveness, and the real question at issue largely resolves itself into a matter of their present productiveness, which has been already discussed. Most of these bottoms are sufficiently clothed with shells to insure their share of a good strike. The depleted areas, excepting in the places specifically mentioned in the descriptions of the individual rocks, may be regarded as hopeless of recuperation under natural conditions.

The barren bottoms, which preceding tables show to constitute a very large proportion of the areas of the public beds, are in many cases so situated as to be of necessity and for practical considerations impossible of separation from the natural beds without injury to the future of the latter or without due regard to the question of policing and administration. There are, however, certain large areas readily separable from the public grounds, and the latter would suffer practically no diminution in really productive bottom as a result of the severance.

SEED-OYSTER AREA.

This region lies above the line drawn between Deep Creek and Days Point, and is shown on chart 2 accompanying this report. The following table summarizes the extent and condition of the bottoms of different degrees of productiveness included within this part of the Baylor survey:

SUMMARIZED STATEMENT OF OYSTER GROWTH ON SEED AREAS.

Name of ground.	Dense.	Scattering.	Very scattering.	Depleted	Barren.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Warwick No. 1 (above Deep Creek)	2,420	1,131	834	1,611	6,896.8	12,892.8
Isle of Wight No. 1	81	0	8	47	589.0	725.0
Total	2,501	1,131	842	1,658	7,485.8	13,617.8
Per cent	18.4	8.3	6.2	12.2	54.9	100.0

The following table furnishes an estimate of the total content of seed oysters present on the bottoms of varying productiveness at the beginning of the oyster season on September 15, 1909:

SUMMARIZED CONTENT OF OYSTERS ON SEED AREAS.

Name of ground.	Dense.	Scattering.	Very scattering.	Depleted.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Warwick No. 1 (above Deep Creek)	668,540	104,987	61,607	21,803	856,937
Isle of Wight No. 1	11,444	.....	311	778	12,533
Total	679,984	104,987	61,918	22,581	869,470
Average per acre	272	93	73	13	.....
Per cent	78.2	12.1	7.1	2.6	100.0

A considerable proportion of these oysters could not be profitably removed from the beds, being either too sparsely distributed in the first place or constituting a necessary remnant which would become too scattered after tonging had been carried on for a period on bottoms of greater initial productiveness. To show the estimated maximum possible yield of the beds during the present season the following table has been prepared, covering the entire area of seed beds in the James River:

SUMMARY OF AVAILABLE CONTENT OF OYSTERS ON SEED AREAS.

Name of ground.	Dense.	Scattering.	Very scattering.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Warwick No. 1 (above Deep Creek)	569,100	59,900	21,500	650,500
Isle of Wight No. 1	9,000	.....	70	9,070
Total	578,100	59,900	21,570	659,570
Average per acre	232	53	25	.....
Per cent	87.7	9.1	3.2	100.0

In preparing the data on which this table is based it has been assumed that the seed will bring 30 cents per bushel and that no bottom can be considered productive when its yield is reduced below 4 bushels per day of actual tonging, excluding the time occupied in culling. As in the preceding pages of this report, the probable yield is based on the density of the oyster growth and the depth of water on the several parts of each bed.

Although the data employed differs somewhat from that used in the discussion of the bottoms below Deep Creek, owing to the lower price brought by seed as compared with market oysters, the financial return to the tonger from the bottoms designated as respectively dense, scattering, and very scattering is essentially the same. The minimum yield assumed to place a given area above the grade of depleted bottom is valued at $1.20 per day at the prices recently prevailing, and this can not be regarded as other than an extreme minimum, because, when the number of idle days is taken into consideration, a tonger could not afford to work for such low wages. The limit is justifiable only in consideration of the fact that before the dense and scattering areas are reduced to a level so low they will have yielded to the tonger an average daily wage much in excess of this.

If the price of oysters falls below 30 cents per bushel, it will not be profitable to work the beds so closely as was contemplated in the preparation of the above table. At the prices reported as current on the James River in November, 1909, namely, 20 cents per bushel for seed, the estimated catch on the area of very scattering growth may be eliminated, that on the scattering bottom reduced by at least 50 per cent and on the dense areas by about 15 per cent, lowering the

total estimated catch to about 500,000 bushels as a maximum which could be taken with profit.

As was the case with the market-oyster beds, the areas described as bearing dense and scattering growths may be dismissed from further discussion as being at present productive. The areas bearing a very scattering growth are debatable, with seed oysters selling at 30 cents per bushel, but would be undoubtedly entirely neglected by the tongers were the price to fall to 20 cents. Their estimated yield at the former price is about $7.50 per acre, and from the entire area of 842 acres the total product during the present season would not exceed in value $6,500, even if the tongers were willing to work for an average of about $1 per day, exclusive of the time lost through bad weather.

The future of these areas of very scattering growth is difficult to forecast. When, as in the area under discussion, there is not and from the nature of the case should not be any application of the cull law, there is no young growth which can be pointed to as coming forward to replace the larger oysters removed. Young and old alike are taken and the only oysters left are the residuum which it is unprofitable to take. In other words, the annual increment is taken or may be taken in the months immediately following its deposit. The health and perpetuity of the beds depend upon the quantity of clean shells exposed on the bottom ready for the strike which each season may produce. Over the very scattering bottoms of this part of James River there is a fair quantity of shells and under the proper conditions these areas may become more productive.

The depleted bottoms, as a whole, have neither present nor prospective value under natural conditions, though the bottom is generally of such character that if it were feasible to rent it for purposes of oyster culture it could be made highly productive. Much of it is so situated, however, that it is debatable whether, for reasons of administration, it would be advisable to alienate it from the public grounds. An inspection of the charts will show that, excepting along the shores, these bottoms are generally in the midst of productive areas. Concerning the great area of barren bottoms the same statement holds true in part, a considerable proportion of it lying in the channels and deeper holes between the beds or in other situations which would make it difficult to delimit it from the public grounds in a manner to facilitate the policing of the public rocks and prevent abuses which experience shows would undoubtedly be attempted.

There are, however, certain areas in considerable blocks which could be set apart for purposes of oyster culture without materially reducing the area of the natural rocks included in the public grounds. These places can be determined by an inspection of the chart.

CONCLUSION.

The foregoing gives, in detail and summary, the facts as to the condition of the oyster beds of James and Nansemond rivers immediately prior to the opening of the present oyster season, the period at which the beds are at their maximum apparent productiveness. Within a few weeks, under the intensive fishery which they sustain, the quantity of oysters on the beds will be vastly reduced and long before the close of the season they will become so impaired that work on them will be practically abandoned for the time being. In other words, it is for a part of the season only that these beds will offer a livelihood to the tongers, who for the rest of the year must seek a living either in the employ of the oyster grower or in some other occupation not connected with oyster fishing.

In the determination of the nature of tidal bottoms, with respect to their being regarded as oyster rock or barren bottom, the prime consideration is whether they will afford, either at present or prospectively, a sufficient quantity of oysters to provide a livelihood to those who work on them. It is manifest that a few oysters which could never be taken with profit should not entitle the bottom on which they lie to be regarded as an oyster bed within the meaning of the laws. To so regard them would be contrary to common sense, economic principles, and judicial decisions.

The author has avoided a definition of what constitutes a livelihood, believing that to be a matter which is more properly for determination by the state authorities should its definition become necessary for purposes of legislation or administration. In the preparation of the foregoing report, however, it has been necessary to adopt some standard for the classification of the various densities of oyster growth in the several beds, and for purposes of convenience the limit between the bottoms regarded as depleted and those of the lowest class of productiveness has been placed at a minimum believed to be reasonably irreducible. The subdivisions of productiveness differ by such small quantities that should it appear that the lowest is too low the next higher can be regarded as the minimum without impairing the value of the data adduced in the report, though, as is elsewhere indicated, this would dictate a reduction in the estimated total available product of oysters for the season.

Under the terms of the resolution of the State Board of Fisheries which was made the basis of the request for the survey preferred to the Bureau of Fisheries by the Governor of Virginia, the author is not warranted in offering recommendations as to the use which might be made of the facts developed in the preceding pages. It may not be inappropriate, however, to point out the several avenues of procedure which it is possible to follow in respect to the oyster

bottoms of the region discussed. These resolve themselves into three: (1) The maintenance of the integrity of the public grounds as now constituted; (2) their abolition in toto; and (3) a middle course which will preserve to the public the productive bottoms practically in their entirety while throwing open to oyster planting a large part of the barren and unproductive bottom now included within the public grounds. The principal arguments for and against these propositions may be epitomized as follows:

1. The first course—that the beds be retained in the present status—hardly needs discussion. It has been tried and its results are known, largely as the effect of the acrimonious disputes to which it has given rise. The matters of fact which have been at issue in these interminable discussions, as to whether or not the public grounds embraced any considerable area of barren bottom, have been dealt with in the preceding pages and speak for themselves. It should be pointed out, however, that while the barren area is shown to constitute a considerable proportion of the whole bottom, much of it is so related to the productive bottom that it could not be eliminated under any scheme permitting of practical administration.

2. The second alternative—the total abolition of the public grounds and its corollary, the opening of the whole area for leasing—is drastic. On broad economic grounds the proposition is as logical and legitimate as the sale of public timber land or the breaking up of the great public ranges of the West into holdings in severalty, and, as the oyster is sessile, it has nothing in common with an alienation of the common fishery for nomadic species. The law has already recognized that under conditions an oyster in situ may be property, while a wandering fish can not become such until caught. The breaking up of the public grounds into leaseholds under private control would increase their productiveness precisely as the breaking up of the common ranges of the West has resulted in economic efficiency and greater productiveness. This course would, furthermore, yield a return to the State, where there is now a net outlay for policing the public grounds, though this aspect of the matter is one which should always be held subservient to the major consideration—the welfare and prosperity of the citizen.

On the other side of the question it is necessary to consider the effect of so drastic an innovation upon the welfare of a large body of persons whose livelihood in part is at present dependent upon the situation to which the policy of the State has given the aspect of presumed permanency. Immediately upon the alienation of the public beds the men engaged on them for part of the season are, for the time being, forced from the category of independent workers into that of employees, unless they themselves elect to take up

bottoms in severalty. The value of this objection is mainly sentimental, but is not less real on that account.

3. The third course mentioned, the retention of the actually productive bottom for the use of the public and the opening of all barren bottom practicable for leasehold from the State, is essentially a compromise between the other two and presents fewer difficulties than either. The valid objections to it are mainly concerned with administration. By retaining the present natural beds intact the tongers would be left in possession of everything of value to which they now have access, while the opening of the barren bottoms for lease would make productive considerable acres now valueless to all. The tongers would still have the option of independent work on the natural rocks; they would have increased opportunities of employment by the planters; and some of them could themselves lease bottoms for their own use. In every way it would appear to be economically advantageous to the industry and the State.

In considering the subject, however, it should be borne in mind that, while this report shows a preponderance of barren bottom within the public grounds, much of it, owing to its location, is practically incapable of separation from the natural rocks. An inspection of the chart will show that many of the barren bottoms are between or in the midst of naturally productive bottoms. To exclude them would make necessary an undue multiplication of the public grounds, with an attendant difficulty in policing.

Effectually to prevent depredations on the natural rocks under the guise of work on adjoining planted grounds, which is a difficulty with which the oyster police will have to contend, the public areas should be as few and as compact as possible, and the boundary lines should be straight and easily defined. For this reason the public grounds to be established must, for very practical considerations, necessarily include a considerable proportion of barren bottom. Any readjustment of the lines of the Baylor survey should be based on reasonable compromise and adopted only after careful consideration by the State. It is believed that the foregoing descriptions and the accompanying charts will furnish a reliable basis for a revision, should the State deem it wise to undertake it.

DESCRIPTION OF CHARTS.

The public grounds are platted from the published sheets of the Baylor survey, and their boundaries are shown in broken black lines.

The depths, which are expressed in feet as referred to mean low water and the symbols designating the consistency of the bottom, are the characteristics selected from a large number of observations. The oyster beds are included within solid red lines, and the density of the oyster growth is indicated by the relative intensity of the shading, and is based on the quantity of culled oysters which can be taken by a tonger working nine hours per day, not including the time occupied in culling.

Chart 1 covers the area from which market oysters only may be removed, and the bases of the classifications of oyster growth are as follows: Dense, yielding over 8 bushels of market oysters per day's tonging; scattering, between 5 and 8 bushels; very scattering, between 3 and 5 bushels; depleted, under 3 bushels.

Chart 2 embraces the beds of the upper part of James River, on which the cull law is inoperative so far as it pertains to the size of the oysters, and which are therefore devoted to the production of seed oysters for replanting. The classification is as follows: Dense, yielding over 12 bushels of seed oysters per day's tonging; scattering, between 8 and 12 bushels; very scattering, between 4 and 8 bushels; depleted, under 4 bushels.

The unshaded areas within the boundaries of the public beds as charted represent barren bottom.

THE FISHERIES OF ALASKA IN 1909

By MILLARD C. MARSH

Agent at the Salmon Fisheries of Alaska

and

JOHN N. COBB

Assistant Agent

Bureau of Fisheries Document No. 730

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THE FISHERIES OF ALASKA IN 1909.

By MILLARD C. MARSH, *Agent at the Salmon Fisheries of Alaska,*
and
JOHN N. COBB, *Assistant Agent.*

SUMMARIZED STATISTICS OF ALASKA FISHERIES.

As in the similar reports for previous years, the District of Alaska is considered in the four geographic sections generally recognized, as follows: Southeast Alaska, embracing all that narrow strip of mainland, and the numerous islands adjacent, from Portland Canal northwestward to and including Yakutat Bay; central Alaska, the region on the Pacific, or south side, from Yakutat Bay westward, including the Aleutian chain; western Alaska, the shores of Bering Sea, and islands in this sea; and arctic Alaska, from Bering Strait to the Canadian border.

With the exception of arctic Alaska and a portion of central and western Alaska, practically all of the fishing localities were visited by one or the other of the agents. Statistics of the yield of fur seals from the Pribilof Islands were obtained through the courtesy of the agent at the fur seal islands, while figures for the other aquatic furs (except the coast fur seals and sea otter) and skins, also whalebone and walrus ivory, were obtained from the custom-house records at Juneau. Considerable commercial fishing is carried on in the Yukon River and its tributaries, where fish wheels, nets, and spears are employed, but unfortunately it has been found impossible so far, owing to the short time available each season and the few agents employed, to extend the inspection work over this large region, or to secure data showing the extent of the fisheries there.

Owing to the impossibility of the agents' visiting arctic Alaska in the limited open season, thus making it difficult to secure accurate data, no attempt has been made to show the number of persons employed and the investment in the fisheries of this large region, although certain of the products are shown in the proper table. It has also been found an impossibility to secure even approximate

data as to the persons engaged or the investment in the hunting of aquatic animals (except fur seals and sea otters), which is general among the natives.

As in previous years, by far the greater part of the fishery products of Alaska are marketed outside the district, but a steadily increasing local demand is noticeable, especially in the case of the hitherto somewhat neglected minor species.

PERSONS ENGAGED.

The number of persons engaged in the fisheries of Alaska in 1909 was 12,588, of whom 4,487 were engaged directly in fishing, 7,520 in the canneries, salteries, and at other shore work, and 581 employed on the transporting vessels. This total is a loss of 749 from the number employed in 1908, due to the closing of several canneries temporarily, owing to the expected large quadrennial run on Puget Sound. The fact that the fishermen act as sailors on the transporting ships to and from the salmon canneries and salteries explains the small number of transporters shown in the table.

PERSONS ENGAGED IN THE ALASKA FISHERIES IN 1909.

Occupation and race.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Vessel—				
Whites	197	3	.....	200
Indians	14	20	.....	34
Japanese	4	.....	.....	4
Total	215	23	.....	238
Shore—				
Whites	731	617	1,425	2,773
Indians	1,184	192	87	1,463
Japanese	13	.....	.....	13
Total	1,928	809	1,512	4,249
Total fishermen	2,143	832	1,512	4,487
Shoresmen—				
Whites	576	308	1,200	2,084
Indians	860	129	307	1,296
Chinese	546	377	1,075	1,998
Japanese	358	356	1,428	2,142
Total	2,340	1,170	4,010	7,520
Transporters:				
Whites	190	162	199	551
Indians	13	17	.....	30
Total	203	179	199	581
Grand total	4,686	2,181	5,721	12,588

INVESTMENT.

The total investment in the fisheries was $9,881,682, a decrease of $438,102, due to causes outlined elsewhere. The item of outfit, as

related to fishing and transporting vessels, has been added to the value of the vessels. The item of cash capital was eliminated in the 1906 report, and this procedure has been followed ever since. Western Alaska leads in the total value of investment, followed by southeast and central Alaska, in the order named. The principal forms of apparatus all show small decreases in the number used as compared with 1908, the decrease in the number of traps alone being 13.

INVESTMENT IN THE ALASKA FISHERIES IN 1909.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Fishing vessels:								
Steamers and launches	32	$167,395	.....	.....	.....	.....	32	$167,395
Tonnage	452	.....	.....	.....	.....	.....	452	.....
Sailing	13	11,762	1	$2,750	.....	.....	14	14,512
Tonnage	155	.....	37	.....	.....	.....	192	.....
Transporting vessels:								
Steamers and launches	85	377,250	31	300,174	42	$788,266	158	1,465,690
Tonnage	1,254	.....	1,544	.....	3,387	.....	6,185	.....
Sailing	6	183,800	14	379,500	29	702,240	49	1,265,540
Tonnage	8,581	.....	15,407	.....	38,057	.....	62,045	.....
Boats	1,058	145,011	695	83,485	905	292,755	2,658	521,251
Apparatus, vessel fisheries:								
Purse seines	2	3,000	.....	.....	.....	.....	2	[a] 3,000
Trawl lines	.....	6,500	.....	.....	.....	.....	.....	6,500
Harpoon guns	2	350	.....	.....	.....	.....	2	[b] 350
Shotguns	.....	.....	20	240	.....	.....	20	240
Apparatus, shore fisheries:								
Haul seines	59	14,711	52	15,475	2	180	113	[c] 30,366
Purse seines	103	30,088	.....	.....	.....	.....	103	[d] 30,088
Gill nets	256	34,030	57	11,020	896	66,706	1,209	[e] 111,756
Dip nets	12	120	14	7	.....	.....	26	127
Lines, hand	.....	573	.....	2,015	.....	.....	.....	2,588
Lines, trawl	.....	2,275	.....	600	.....	.....	.....	2,875
Traps, stake	36	79,700	20	29,450	17	21,644	73	130,794
Traps, floating	14	19,750	1	1,500	.....	.....	15	21,250
Crab pots	651	818	.....	.....	.....	.....	651	818
Spears	30	37	.....	.....	.....	.....	30	37
Hoes	10	7	6	4	.....	.....	16	11
Shotguns	40	1,200	.....	.....	.....	.....	40	1,200
Shore and accessory property	.....	2,139,737	.....	1,263,716	.....	2,701,841	.....	6,105,294
Total	.....	3,218,114	.....	2,089,936	.....	4,573,632	.....	9,881,682

[a] Aggregate length of 500 yards.
[b] Includes also value of 14 harpoons.
[c] Aggregate lentgh of 33,670 yards.
[d] Aggregate length of 36,930 yards.
[e] Aggregate length of 301,480 yards.

PRODUCTS.

The total quantity of products was 201,983,238 pounds, valued at $11,181,388, a decrease of 15,830,177 pounds and $666,055 from 1908, the greater part of the decrease being in salmon products. Except for salmon bellies and backs, fertilizer, oil, furs, and hides, the weights are round weights, or the weights of products when first taken from the water; for prepared products the weights are shown in the subsidiary tables of the report. As the packing establishments almost invariably catch their own fish, it has been found practically impossible to show the value of the products as they leave the fishermen's hands, hence the values shown are for the prepared products.

Products of Alaska Fisheries in 1909.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Black cod:						
Fresh	16,765	$705				
Frozen	3,967	119				
Pickled	18,700	666				
Cod:						
Fresh	8,000	400	5,900	$237		
Dry-salted (kench-cured)			4,441,925	116,601		
Dry-salted (stockfish)			45,000	1,200		
Pickled			5,133	183		
Tongues, pickled			5,900	600		
Eulachon:						
Fresh	3,000	120	1,500	55		
Pickled	40,000	1,000	4,000	250		
Smoked	400	18				
Flounders, or sole	6,100	183	2,000	60		
Halibut:						
Fresh	4,835,323	176,961	45,000	1,800		
Frozen	240,604	14,436				
Fletched	113,997	4,132				
Herring:						
Fresh	900,000	10,000	9,000	270	2,000	$100
Pickled	1,393,120	12,376				
Eggs, dried	818	82				
Pollock			2,000	100		
Redfish, or black bass:						
Fresh	16,312	815	7,900	395		
Frozen	3,149	158				
Rock cod	15,600	775	10,000	400		
Salmon:						
Fresh—						
Coho, or silver	12,000	160	6,000	180		
Humpback, or pink	24,000	300				
King, or spring	937,705	39,707				
Red, or sockeye	8,400	336	22,000	660		
Frozen—						
Coho, or silver	35,721	1,072				
Dog, or chum	77,882	1,558				
Canned—						
Coho, or silver	2,794,400	160,974	719,250	43,155	445,270	26,900
Dog, or chum	5,810,070	186,454			2,639,770	87,656
Humpback, or pink	31,919,930	1,092,389	390,670	13,394	230,510	9,056
King, or spring	59,990	3,598	1,183,910	74,418	2,118,480	129,608
Red, or sockeye	19,116,510	1,094,423	25,079,950	1,640,910	75,174,645	4,875,217
Mild-cured—						
King, or spring	2,880,086	149,300				
Pickled—						
Coho, or silver	54,540	1,405	24,030	810	7,290	270
Dog, or chum	4,050	90			5,400	100
Humpback, or pink	421,335	9,447				
Humpback, or pink backs	11,200	224				
King, or spring	8,370	248			110,700	3,550
Red, or sockeye			591,030	17,319	6,565,860	149,979
Dry-salted—						
Coho backs			14,500	549		
Dogs	95,466	1,038				
Humpback backs	50,000	500	1,500	45		
King salmon	1,200	45				
Red backs			83,000	2,302		
Smoked—						
Coho backs			4,000	400		
Dogs	585	43				
Red backs			28,300	1,580	12,000	1,200
Salmon bellies, pickled:						
Coho, or silver			227,750	3,843		
Humpback, or pink	123,480	6,896	46,000	500		
King, or spring	7,000	175				
Red, or sockeye			783,600	13,902		
Smelt	8,780	534				
Tomcod	1,000	40				
Trout:						
Cutthroat	900	45				
Dolly Varden, or salmon trout	47,000	1,880	18,000	900		
Rainbow	6,500	260				
Steelhead—						
Fresh	2,200	88				
Frozen	9,450	473				
Fertilizer:						
Herring	2,150,776	30,713				
Salmon	159,224	2,287				
Whale	1,161,616	16,518				

PRODUCTS OF ALASKA FISHERIES IN 1909—Continued.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Oil:						
Herring	1,609,752	$42,827				
Salmon	120,113	3,216				
Whale	2,524,290	102,050				
Clams	7,500	375	2,640	$99		
Crabs	130,120	4,839	24,000	1,600		
Aquatic furs and skins:						
Beaver	769	3,819	1,465	6,660	89	$434
Castoreum	2	5	33	96		
Muskrat	119	118	235	268	14,842	33,688
Otter—						
Land	2,177	8,827	1,175	4,413	380	1,364
Sea			45	3,050	140	6,766
Seal—						
Fur	2,382	7,383			86,208	590,600
Hair	11,526	2,022			8,242	1,501
Fur seal testes, etc					600	250
Whale products:						
Bones, unground	75,100	1,502				
Bones, ground	396,036	5,944				
Meat, pickled	16,349	780				
Tails, pickled	36,635	1,720				
Sinews	739	75				
Skins	1,261	250				
Stearin	61,137	2,238				
Whalebone or baleen	83,594	5,282				
Walrus ivory	5	5	51	45		
Seaweed	1,400	210				
Total	80,698,227	3,219,644	33,838,392	1,953,249	87,422,426	5,918,239

PRODUCTS OF ALASKA FISHERIES IN 1909—Continued.

Products.	Arctic Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.
Black cod:				
Fresh			16,765	$705
Frozen			3,967	119
Pickled			18,700	666
Cod:				
Fresh			13,900	637
Dry-salted (kench-cured)			4,441,925	116,601
Dry-salted (stockfish)			45,000	1,200
Pickled			5,133	183
Tongues, pickled			5,900	600
Eulachon:				
Fresh			4,500	175
Pickled			44,000	1,250
Smoked			400	18
Flounders, or sole			8,100	243
Halibut:				
Fresh			4,880,323	178,761
Frozen			240,604	14,436
Fletched			113,997	4,132
Herring:				
Fresh			911,000	10,370
Pickled			1,393,120	12,376
Eggs, dried			818	82
Pollock			2,000	100
Redfish, or black bass:				
Fresh			24,212	1,210
Frozen			3,149	158
Rock cod			25,600	1,175
Salmon:				
Fresh—				
Coho, or silver			18,000	340
Humpback, or pink			24,000	300
King, or spring			937,705	39,707
Red, or sockeye			30,400	996
Frozen—				
Coho, or silver			35,721	1,072
Dog, or chum			77,882	1,558

PRODUCTS OF ALASKA FISHERIES IN 1909—Continued.

Products.	Arctic Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.
Salmon—Continued.				
Canned—				
Coho, or silver			3,958,920	$231,029
Dog, or chum			8,449,840	274,110
Humpback, or pink			32,541,110	1,114,839
King, or spring			3,362,380	207,624
Red, or sockeye			119,371,105	7,610,550
Mild-cured—				
King, or spring			2,880,086	149,300
Pickled—				
Coho, or silver			85,860	2,485
Dog, or chum			9,450	190
Humpback, or pink			421,335	9,447
Humpback, or pink backs			11,200	224
King, or spring			119,070	3,798
Red, or sockeye			7,156,890	167,298
Dry-salted—				
Coho backs			14,500	549
Dogs			95,466	1,038
Humpback backs			51,500	545
King salmon			1,200	45
Red backs			83,000	2,302
Smoked—				
Coho backs			4,000	400
Dogs			585	43
Red backs			40,300	2,780
Salmon bellies, pickled:				
Coho, or silver			227,750	3,843
Humpback, or pink			169,480	7,396
King, or spring			7,000	175
Red, or sockeye			783,600	13,902
Smelt			8,780	534
Tomcod			1,000	40
Trout:				
Cutthroat			900	45
Dolly Varden, or salmon trout			65,000	2,780
Rainbow			6,500	260
Steelhead—				
Fresh			2,200	88
Frozen			9,450	473
Fertilizer:				
Herring			2,150,776	30,713
Salmon			159,224	2,287
Whale			1,161,616	16,518
Oil:				
Herring			[a] 1,609,752	42,827
Salmon			[b] 120,113	3,216
Whale			[c] 2,524,290	102,050
Clams			[d] 10,140	474
Crabs			[e] 154,120	6,439
Aquatic furs and skins:				
Beaver			[f] 2,323	10,913
Castoreum			35	101
Muskrat			[g] 15,196	34,074
Otter—				
Land			[h] 3,732	14,604
Sea			[i] 185	9,816
Seal—				
Fur			[j] 88,590	597,983
Hair			[k] 19,768	3,523
Fur seal testes, etc			600	250
Whale products:				
Bones, unground			75,100	1,502
Bones, ground			396,036	5,944
Meat, pickled			16,349	780
Tails, pickled			36,635	1,720
Sinews			739	75
Skins			1,261	250
Stearin			61,137	2,238
Whalebone or baleen	21,970	$82,042	105,564	87,324
Walrus skins	1,250	100	[l] 1,250	100
Walrus ivory	973	731	1,029	781
Seaweed			1,400	210
Total	24,193	82,873	201,983,238	11,181,388

[a] Represents 214,635 gallons.
[b] Represents 16,015 gallons.
[c] Represents 336,572 gallons.
[d] Represents 1,080 bushels.
[e] Represents 62,548 crabs.
[f] Represents 1,280 skins.
[g] Represents 121,568 skins.
[h] Represents 1,493 skins.
[i] Represents 37 skins.
[j] Represents 14,765 skins.
[k] Represents 6,616 skins.
[l] Represents 50 skins.

THE SALMON INDUSTRY.

The season of 1909, while not so good as that of the previous year, which was the best the fishermen have ever had, was excellent so far as the quantity of fish obtained was concerned. The prices received for the cheaper grades, however, were not so remunerative as in some previous seasons.

The run in southeast Alaska, except in the lower portion, was very good, but the cannery men packed no more of the cheaper grades than they felt could be disposed of. As a result the catch of humpback salmon was 4,734,525 less and of dog salmon 1,069,269 less in number than in 1908.

In central Alaska the run in the neighborhood of Karluk fell off very materially as compared with 1908, but in Chignik the usual good run appeared, and the Alaska Packers Association sent to its Karluk canneries 54,605 red salmon, while the Northwestern Fisheries Company transferred to its Uyak cannery 100,950 red salmon.

In western Alaska the ice in Bristol Bay was found to be very troublesome this year, and some of the supply ships found difficulty in reaching their plants in time to get ready for the opening of the season. The steamer *Nushagak*, of the Alaska Packers Association, was held seven days in the ice pack not far off the mouth of Nushagak Bay. With the exception of the Ugashik and Ugaguk rivers and the Nushagak Bay region the runs were fairly good. The falling off in the latter region has been discussed in detail elsewhere in the report. In order to help out the canneries on the Nushagak and Ugaguk, canneries on the Naknek and Kvichak, owned by the same companies, sent to the Nushagak 123 king salmon and 289,688 red salmon, and to the Ugaguk River 12,178 red salmon.

In the Nushagak Bay the weather was especially bad during the greater part of the season, and as a result eight fishermen lost their lives through the capsizing of their boats.

PLANTS IN OPERATION.

Following is a list of the plants operated during the season of 1909:

Name.	Location.
Southeast Alaska:	
Canneries—	
Alaska Packers Association	Loring and Wrangell.
Northwestern Fisheries Co	Quadra, Hunter Bay, Santa Ana, and Dundas Bay.
William Duncan	Metlakahtla.
C. A. Burckhardt & Co	Yes Bay.
F. C. Barnes	Lake Bay.
Shakan Salmon Co	Shakan.
North Pacific Trading and Packing Co	Klawak.
Pillar Bay Packing Co	Pillar Bay.
Pacific Coast and Norway Packing Co	Petersburg.
John L. Carlson	Taku Harbor.
George T. Myers & Co	Sitkoh Bay.
Thlinket Packing Co	Funter Bay.

Name.	Location.
Southeast Alaska—Continued.	
Canneries—Continued.	
Pacific-American Fisheries	Excursion Inlet.
Columbia Canning Co.	Haines.
Yakutat and Southern Ry. Co	Yakutat.
Salteries, etc.—	
Mrs. A. E. King	Sunny Point.
James Thompson	Skowl Arm.
Ketchikan Fisheries Co	Nakat Inlet.
Louis Peterson	Threemile, Kupreanof Island.
Fred. Brockman	Sarkaar.
R. E. Linton	Grace Harbor, Dall Island.
Knute Hauge	Wrangell Narrows.
M. E. Lane	Thorne Bay.
Walter C. Waters	Holbrook.
John H. Mantle	Olive Bay.
Vendsyssel Packing Co	Port Vaughn.
Rasmus Engee	Wrangell.
E. L. Skog	Petersburg.
J. Lindenberger (Incorporated)	Ketchikan, Egg Island, and Douglas.
Carlson & Holst	Chilkat Inlet.
Malcolm Campbell	Alsek River.
K. J. Johansen	Ideal Cove.
Engelbr. Wiese	Ketchikan and Cape Fanshaw.
George Scove	Kake.
Central Alaska:	
Canneries—	
Alaska Packers Association	Chignik, Karluk (2), Alitak, and Kasilof.
Northwestern Fisheries Co	Orca, Uyak, and Chignik.
Salteries, etc.—	
Alaska Commercial Co	Kodiak.
Blodgett & Blinn	Do.
J. A. Herbert & Co	English Bay.
Brostrup Amondsen	Ozenoy.
Osmund & Andersen	Thin Point.
Western Alaska:	
Canneries—	
Alaska Packers Association	Naknek River (2), Ugaguk River, Nushagak Bay (2), and Kvichak Bay (2).
Northwestern Fisheries Co	Nushagak Bay.
Red Salmon Canning Co	Ugashik River.
North Alaska Salmon Co	Nushagak Bay, Lockonok, Kvichak River, and Ugaguk River.
Naknek Packing Co	Naknek River
L. A. Pedersen	Kvichak Bay.
Alaska-Portland Packers Association	Nushagak Bay.
Columbia River Packers Association	Do.
Alaska Fishermen's Packing Co	Do.
Salteries, etc.:	
Lagoon Salmon Co	Nelson Lagoon.
Peter M. Nelson	Igushik River.
Nelson, Olsen & Co	Kvichak Bay.

HATCHERIES.

Seven salmon hatcheries were operated during the season of 1908–9, as follows:

Name.	Location.	Owner and operator.
Yes Lake	Yes Lake	United States Bureau of Fisheries.
Afognak	Afognak Island	Do.
Fortmann	Naha Stream	Alaska Packers Association.
Karluk	Karluk River	Do.
Klawak	Klawak Lake	North Pacific Trading and Packing Co.
Hetta	Hetta Lake	Northwestern Fisheries Co.
Quadra	Quadra Lake	Do.

Although the streams in southeast Alaska were unusually high in September, owing to the excessive rains (29 inches of rain fell at Yes

Lake hatchery during this month) the hatcheries were able to prevent their dams and racks from being washed out, and all, with the exception of Fortmann hatchery, where the water was so high as to interfere seriously with seining, secured all the eggs they were able to handle.

The Northwestern Fisheries Company has constructed at its Hetta hatchery a large corral of wire netting in which to retain the fry for a short time.

OUTPUT OF THE SALMON HATCHERIES OF ALASKA.

Hatcheries.	Year ending June 30, 1909.					
	Red, or sockeye.		Coho, or silver.		Humpback.	
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
Yes Lake	50,000,000	48,653,000	17,000	9,900	.....	.....
Afognak	46,380,000	39,325,870	.....	.....	.....	10,000
Fortmann	24,465,000	22,785,000	.....	.....	.....	.....
Karluk	40,320,000	37,105,000	.....	.....	.....	.....
Klawak	3,500,000	3,200,000	.....	.....	.....	.....
Hetta	8,400,000	8,143,000	.....	.....	.....	.....
Quadra	3,325,000	3,025,750	.....	.....	.....	.....
Total	176,390,000	162,237,620	17,000	9,900	.....	10,000

Hatcheries.	Eggs taken, 1909–10.		
	Red, or sockeye.	Coho, or silver.	Humpback.
Yes Lake	72,000,000	5,000	.....
Afognak	76,020,000	.....	499,400
Fortmann	53,340,000	.....	.....
Karluk	45,228,000	.....	.....
Klawak	(a)	.....	.....
Hetta	8,000,000	.....	.....
Quadra	9,660,000	.....	.....
Total	264,248,000	5,000	499,400

a No report received.

One of the most interesting fish-cultural experiments undertaken on the Pacific coast is that of Mr. John C. Callbreath in southeast Alaska. Mr. Callbreath has been a resident of Alaska for many years, and was manager of the Point Ellis salmon cannery until it was destroyed by fire in 1892. He was one of the first who saw that the apparently inexhaustible salmon runs in Alaska could not last forever, and in 1892 opened a rude little hatchery on Point Ellis Stream. A high September tide carried away the eggs; but the burning of the cannery left him with leisure to carry out a plan which he had been revolving in his mind for some time. This was to select a stream that under normal conditions carried but a few thousand red salmon, and by artificial propagation increase the production to hundreds of thousands, with the ultimate hope that if

he was successful the government would enact a special law making all the increase his own property.

The stream selected for the experiment is at the head of McHenry Inlet, on Etolin Island, in southeast Alaska. It is small, about one-half mile in length, and, like most of the streams in this region, flows over a rocky and bowldery bed between heavily wooded shelving banks. At its head is a small lake, 42 feet above tide water. The stream was considered to have a run of from 3,000 to 5,000 red salmon, a number too small to attract the fishermen, who rarely visited it. In 1892 a small hatchery was built on the stream about 200 yards from the mouth. In the spring of 1893, however, it was removed to the lake, the first location having been found not to be suitable.

From the very beginning it was decided to exclude all but the most desirable species from the lake. To accomplish this, dams were built across the stream, with racks below them, at a point about 100 yards from salt water, where an islet divides the stream into two parts. The dam and fence on the western side of the islet allow nothing to pass. The fence on the eastern side has a trap opening, admitting the fish to the foot of the dam. Here the red and coho salmon are lifted by dip nets to the pool above, from which point they can ascend quickly to the lake. Nothing can enter the lake which is not passed over the dam by hand. In addition to keeping out the humpback and dog salmon and all trout, the lake has been carefully fished and all enemies of the salmon that could be caught have been removed.

Under these exceptionally favorable conditions the work was carried on from 1892 until the spring of 1906, when Mr. Callbreath was obliged to discontinue the operation of the hatchery, owing to lack of funds and failing eyesight, the latter misfortune resulting a year or two later in total blindness. He still maintained the dam and racks, however, employing a man to lift the fish over the dam as usual each fall.

The following statement shows the number of red salmon passed over the dam each season:

1892	3,000	1901	2,924
1893	3,010	1902	5,077
1894	4,463	1903	5,648
1895	5,026	1904	7,432
1896	3,627	1905	7,623
1897	2,589	1906	7,320
1898	2,010	1907	7,542
1899	2,233	1908	slightly over 3,000
1900	3,854		

It is very evident from the above that Mr. Callbreath's expectations have been far from realized, but he is entitled to great credit for the persistence with which he has carried on the experiment despite the natural difficulties encountered and the almost overwhelming physical afflictions under which he has labored for the past four years.

STATISTICS.

CATCH IN 1907, 1908, AND 1909.

Following is a table showing, for the geographic sections, by apparatus and species and by species alone, the number of salmon caught in the years 1907, 1908, and 1909.

The noticeable feature of the table is the relatively small decrease in the catch of red salmon with gill nets as compared with the large decreases shown for seines and traps. The catch with lines shows a large increase over the two previous years, due to the rapid development of the king salmon fishery.

All species, except king salmon, show a decrease from 1908, this decrease being especially noticeable in humpback salmon, which dropped off 5,614,673 in number. The total decrease in 1909 as compared with 1908 is 8,612,371 in number.

CATCH OF SALMON IN ALASKA IN 1907, 1908, AND 1909, BY SECTIONS, SPECIES, AND APPARATUS.

Apparatus and species.	Southeast Alaska.			Central Alaska.		
	1907.	1908.	1909.	1907.	1908.	1909.
Seines:						
Coho, or silver	302,963	273,993	165,177	48,759	60,847	52,258
Dog, or chum	1,101,822	1,378,339	387,774	.....	.....	.....
Humpback, or pink	8,614,551	8,900,467	5,572,005	252,373	268,466	127,549
King, or spring	259	1,812	293	4,015	3,028	3,907
Red, or sockeye	1,419,221	1,691,149	1,285,265	3,568,069	2,709,750	2,038,833
Total	11,438,816	12,245,760	7,410,514	3,873,216	3,042,091	2,222,547
Traps:						
Coho, or silver	139,783	119,034	112,213	163,076	90,616	89,918
Dog, or chum	158,170	368,709	337,395	.....	.....	.....
Humpback, or pink	3,438,335	5,102,843	3,628,940	6,420	375,140	3,740
King, or spring	26,835	3,448	5,107	36,791	17,216	44,632
Red, or sockeye	615,684	486,646	923,816	2,711,142	2,285,401	2,152,555
Total	4,378,807	6,080,680	5,007,471	2,917,429	2,768,373	2,290,845
Gill nets:						
Coho, or silver	83,943	84,176	78,845	15,000	.....	.....
Dog, or chum	74,298	56,431	9,041	.....	.....	.....
Humpback, or pink	18,029	59,582	127,422	.....	.....	.....
King, or spring	70,388	64,148	68,659	27,022	18,351	18,059
Red, or sockeye	214,442	378,834	478,398	358,649	512,464	487,984
Total	461,100	643,171	762,365	400,671	530,815	506,043
Lines:						
Coho, or silver	1,052	1,329	8,000	.....	.....	.....
King, or spring	23,082	61,633	134,606	.....	.....	.....
Total	24,134	62,962	142,606	.....	.....	.....
Spears:						
Red, or sockeye	20,000	4,000	15,400	.....	.....	.....
Wheels:						
King, or spring	.....	27	.....	.....	.....	.....
Total:						
Coho, or silver	527,741	478,532	364,235	226,835	151,463	142,176
Dog, or chum	1,334,290	1,803,479	734,210	.....	.....	.....
Humpback, or pink	12,070,915	14,062,892	9,328,367	258,793	643,606	131,289
King, or spring	120,564	131,068	208,665	67,828	38,595	66,598
Red, or sockeye	2,269,347	2,560,629	2,702,879	6,637,860	5,507,615	4,679,372
Grand total	16,322,857	19,036,600	13,338,356	7,191,316	6,341,279	5,019,435

CATCH OF SALMON IN ALASKA IN 1907, 1908, AND 1909, ETC.—Continued.

Apparatus and species.	Western Alaska.			Total.		
	1907.	1908.	1909.	1907.	1908.	1909.
Seines:						
Coho, or silver				351,722	334,840	217,435
Dog, or chum				1,101,822	1,378,339	387,774
Humpback, or pink				8,866,924	9,168,933	5,699,554
King, or spring				4,274	4,840	4,200
Red, or sockeye				4,987,290	4,400,899	3,324,098
Total				15,312,032	15,287,851	9,633,061
Traps:						
Coho, or silver	29,199	20,000	9,930	332,058	229,650	212,061
Dog, or chum	36,141	114,534	101,456	194,311	483,243	438,851
Humpback, or pink	1,500	261,519	15	3,446,255	5,739,502	3,632,695
King, or spring	5,011	4,856	3,096	68,637	25,520	52,835
Red, or sockeye	1,078,869	860,516	508,011	4,405,695	3,632,563	3,584,382
Total	1,150,720	1,261,425	622,508	8,446,956	10,110,478	7,920,824
Gill nets:						
Coho, or silver	109,650	86,088	71,393	208,593	170,264	150,238
Dog, or chum	472,586	340,309	346,340	546,884	396,740	355,381
Humpback, or pink	337,514	138,138	31,811	355,543	197,720	159,233
King, or spring	134,391	87,174	128,893	231,801	169,673	215,611
Red, or sockeye	9,181,034	16,013,966	15,133,872	9,754,125	16,905,264	16,100,254
Total	10,235,175	16,665,675	15,712,309	11,096,946	17,839,661	16,980,717
Lines:						
Coho, or silver				1,052	1,329	8,000
King, or spring				23,082	61,633	134,606
Total				24,134	62,962	142,606
Spears:						
Red, or sockeye				20,000	4,000	15,400
Wheels:						
King, or spring					27	
Total:						
Coho, or silver	138,849	106,088	81,323	893,425	736,083	587,734
Dog, or chum	508,727	454,843	447,796	1,843,017	2,258,322	1,182,006
Humpback, or pink	339,014	399,657	31,826	12,668,722	15,106,155	9,491,482
King, or spring	139,402	92,030	131,989	327,794	261,693	407,252
Red, or sockeye	10,259,903	16,874,482	15,641,883	19,167,110	24,942,726	23,024,134
Grand total	11,385,895	17,927,100	16,334,817	34,900,068	43,304,979	34,692,608

SUPPLEMENTARY TABLE SHOWING NUMBER AND GROSS WEIGHT OF EACH SPECIES OF SALMON CAUGHT IN 1907, 1908, AND 1909.

Species.	1907.		1908.		1909.	
	Number.	Pounds.	Number.	Pounds.	Number.	Pounds.
Coho, or silver	893,425	5,360,550	736,083	4,416,498	587,734	3,526,404
Dog, or chum	1,843,017	14,744,136	2,258,322	18,066,576	1,182,006	9,456,048
Humpback, or pink	12,668,722	50,674,888	15,106,155	60,424,620	9,491,482	37,965,928
King, or spring	327,794	7,211,468	261,693	5,757,246	407,252	8,959,544
Red, or sockeye	19,167,110	95,835,550	24,942,726	124,713,630	23,024,134	115,120,670
Total	34,900,068	173,826,592	43,304,979	213,378,570	34,692,608	175,028,594

CANNING.

When the season opened practically the only stocks left in the canners' hands were pink salmon, these having proved difficult to

dispose of even at the very low prevailing prices. A few of the canners left these fish at their plants in Alaska during the winter, in order to save the storage charges on the Sound. The price of pink and dog salmon continued to decline this year, but a slightly better demand developed and it is hoped that as the accumulated pack on Puget Sound decreases the demand for the cheap grades from Alaska will eventually equal the supply. All other grades are in excellent demand at present and but few cases were left in the packers' hands at the close of this year.

Owing to the expected quadrennial heavy run of sockeye salmon on Puget Sound, several cannerymen who operate there and in Alaska shut down their Alaska plants this season and devoted all their energies to the Sound. Among those in southeast Alaska were the cannery of Gorman & Co., at Kasaan, and of the Astoria and Puget Sound Packing Company, in Excursion Inlet. The Pyramid Harbor cannery of the Alaska Packers Association was not operated this year and probably will not be again. In western Alaska the Coffee Creek cannery of the Alaska Packers Association, which burned in 1906, was rebuilt and operated this season. The Bradford cannery of the Alaska Packers Association, on Nushagak Bay, was not operated this year, nor, owing to the loss of its supply ship, as noted elsewhere, was the Wood River cannery of the Alaska Salmon Company.

The superintendent of the Sitkoh Bay cannery, in southeast Alaska, reports getting from Necker Bay, on the western shore of Baranof Island, a number of red salmon which ran 24 to the case—exceptionally small fish. They are said to have been very red in color and especially good for canning. Twenty-five of the smallest ones were opened and found to be all mature males.

Persons engaged.—The fishermen engaged this year numbered 2,992, of whom almost two-thirds were white. The cannery employees numbered 7,100, of whom all nationalities except the whites, who increased 312 in number, show decreases as compared with 1908. The transporters numbered 430. All branches of the industry show decreases as compared with 1908. In all, 10,522 persons (4,391 whites, 1,998 Indians, 1,992 Chinese, and 2,141 Japanese) were employed, as compared with 11,085 persons (4,403 whites, 2,250 Indians, 2,017 Chinese, and 2,415 Japanese) employed in 1908.

PERSONS ENGAGED IN THE SALMON-CANNING INDUSTRY IN 1909.

Occupation and race.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Whites	382	399	1,394	2,175
Indians	750	48	10	808
Japanese	9	.....	.....	9
Total	1,141	447	1,404	2,992
Shoresmen:				
Whites	384	271	1,149	1,804
Indians	783	85	304	1,172
Chinese	546	377	1,069	1,992
Japanese	348	356	1,428	2,132
Total	2,061	1,089	3,950	7,100
Transporters:				
Whites	128	102	182	412
Indians	13	5	.....	18
Total	141	107	182	430
Grand total	3,343	1,643	5,536	10,522

Investment.—There were 114 steamers and 39 sailing vessels engaged in transporting supplies and the pack.

Gill nets were the principal form of apparatus in use, by far the greater number being employed in western Alaska. Purse seines and spears were used only in southeast Alaska, haul seines and traps were most numerous there. All forms of apparatus except gill nets show a decrease in 1909 as compared with 1908.

There were 45 canneries in operation (19 in southeast Alaska, 8 in central Alaska, and 18 in western Alaska) as compared with 50 (23 in southeast Alaska, 8 in central Alaska, and 19 in western Alaska) in 1908.

INVESTMENT IN THE SALMON-CANNING INDUSTRY IN 1909.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Canneries	19	.....	8	.....	18	.....	45	.....
Transporting vessels:								
Steamers and launches	50	$277,110	26	$257,340	38	$732,600	114	$1,267,050
Tonnage	937	.....	1,451	.....	3,226	.....	5,614	.....
Sailing	5	173,800	8	311,300	26	672,540	39	1,157,640
Tonnage	7,434	.....	13,955	.....	36,666	.....	58,055	.....
Boats	483	82,186	336	69,850	871	290,460	1,690	442,496
Apparatus:								
Haul seines	36	11,191	21	12,300	.....	.....	57	23,491
Purse seines	93	25,588	.....	.....	.....	.....	93	25,588
Gill nets	97	13,080	57	11,020	883	66,086	1,037	90,186
Traps, stake	33	74,200	19	29,100	14	20,500	66	123,800
Traps, floating	13	19,050	1	1,500	.....	.....	14	20,550
Spears	20	30	.....	.....	.....	.....	20	30
Shore and accessory property	.....	1,722,657	.....	1,183,216	.....	2,574,641	.....	5,480,514
Total	.....	2,398,892	.....	1,875,626	.....	4,356,827	.....	8,631,345

Output.—The table of products shows the quantity and value of each species packed, with size and style of can. As usual, western

Alaska leads in the quantity and value of the pack, followed by southeast and central Alaska, in the order named. Red, or sockeye, salmon predominate in all sections, but more especially in the western, where they form the bulk of the pack. Humpback, or pink, salmon predominate in southeast Alaska. Very few one-half pound and 1-pound flats were packed this year, although quite a number were put up in 1908.

OUTPUT OF SALMON FROM THE CANNERIES IN 1909, BY SPECIES AND SIZE OF CANS.[a]

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Coho, or silver:								
1-pound flat	1,206	$5,543	.....	.....	.....	.....	1,206	$5,543
1-pound tall	38,714	155,431	10,275	$43,155	6,361	$26,900	55,350	225,486
Total	39,920	160,974	10,275	43,155	6,361	26,900	56,556	231,029
Dog, or chum:								
1-pound tall	83,001	186,454	.....	.....	37,711	87,656	120,712	274,110
Humpback, or pink:								
1-pound tall	455,999	1,092,389	5,581	13,394	3,293	9,056	464,873	1,114,839
King, or spring:								
1-pound tall	857	3,598	16,913	74,418	30,264	129,608	48,034	207,624
Red, or sockeye:								
½-pound flat	14,898	58,535	.....	.....	1,487	5,353	16,385	63,888
1-pound flat	80,200	209,962	2,936	15,539	2,057	11,108	85,193	236,609
1-pound tall	185,444	825,926	355,349	1,625,371	1,071,123	4,858,756	1,611,916	7,310,053
Total	280,542	1,094,423	358,285	1,640,910	1,074,667	4,875,217	1,713,494	7,610,550
Grand total	860,319	2,537,838	391,054	1,771,877	1,152,296	5,128,437	2,403,669	9,438,152

[a] All pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of cases containing 48 1-pound cans the pack is 2,395,477½ cases.

Comparison of pack of 1906, 1907, 1908, and 1909.—Of the four years in question, the pack of 1908 surpassed all the others both in quantity and value, having been the largest made since the inception of the industry. The pack of 1909 is next in size and value, followed by 1906 and 1907, in the order named, except that the value of the 1907 pack is greater than that of 1906. The pack of red salmon was larger in 1909 than in any previous year.

Taking the "1-pound tall," which is the common-size can, as a basis of comparison, it is seen that cohos averaged $4.07 per case, an increase of 9 cents per case over 1908 and 16 cents over 1907; dog, or chum, salmon averaged $2.28 per case, a decrease of 26 cents as compared with 1908 and of 70 cents as compared with 1907; humpback, or pink, salmon averaged $2.40 per case, a decrease of 29 cents as compared with 1908 and of 76 cents as compared with 1907; king salmon averaged $4.32 per case, an increase of 12 cents as compared with 1908 and of 14 cents as compared with 1907; while the red, or sockeye, salmon averaged $4.53 per case, an increase of 1 cent per case as compared with 1908 and a decrease of 6 cents per case as compared with 1907.

COMPARISON OF THE OUTPUT OF THE SALMON CANNERIES IN 1906, 1907, 1908, AND 1909.

Products.	1906.		1907.		1908.		1909.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Coho, or silver:								
½-pound flat	3,217	$6,588	969	$4,273	209	$627	.....	.....
1-pound flat	15,944	63,487	3,933	17,292	2,414	9,903	1,206	$5,543
1-pound tall	91,582	312,034	80,772	315,819	66,309	263,559	55,350	225,486
Total	110,743	382,109	85,674	337,384	68,932	274,089	56,556	231,029
Dog, or chum:								
½-pound flat	.....	.....	491	1,228	.....	.....	.....	.....
1-pound flat	.....	.....	664	2,125	107	321	.....	.....
1-pound tall	254,812	730,235	183,262	544,404	218,406	553,876	120,712	274,110
Total	254,812	730,235	184,417	547,757	218,513	554,197	120,712	274,110
Humpback, or pink:								
½-pound flat	2,940	4,851	17,589	46,093	.....	.....	.....	.....
1-pound flat	2,618	8,378	7,406	26,662	569	1,590	.....	.....
1-pound tall	344,209	1,033,722	545,772	1,726,525	643,564	1,731,789	464,873	1,114,839
Total	349,767	1,046,951	570,767	1,799,280	644,133	1,733,379	464,873	1,114,839
King, or spring:								
½-pound flat	189	397	28	98	125	425	.....	.....
1-pound tall	30,748	115,825	43,410	181,620	23,667	99,442	48,034	207,624
Total	30,937	116,222	43,438	181,718	23,792	99,867	48,034	207,624
Red, or sockeye:								
½-pound flat	49,541	125,395	45,383	160,731	21,817	68,083	16,385	63,888
1-pound flat	36,763	161,793	29,821	154,646	26,950	138,120	85,193	236,609
1-pound tall	1,414,426	5,333,687	1,242,600	5,599,850	1,613,911	7,318,048	1,611,916	7,310,053
Total	1,500,730	5,620,875	1,317,804	5,915,227	1,662,678	7,524,251	1,713,494	7,610,550
Grand total	2,246,989	7,896,392	2,202,100	8,781,366	2,618,048	10,185,783	2,403,669	9,438,152

PICKLING.

The Department has construed the Alaska fisheries law to the effect that the packing of salmon bellies without making some economic use of the backs is contrary to the requirements of section 8 of that law. This decision went into effect on January 1, 1909, and considerable interest attached to the probable influence it would have on the packing of bellies, which had hitherto been a quite important part of the pickling business. A number of the salteries gave up the packing of bellies altogether and devoted their attention to the whole fish or else closed up their plants. A few continued packing the bellies and made various use of the backs, such as pickling, drying, and smoking, while one salter extracted the oil from them.

It is the aim of the Department to break up the old wasteful practice by which from one-half to two-thirds of the edible portion of the salmon was thrown away in order that the belly might be pickled, and all who continue packing bellies will be required to furnish satisfactory proof of the economic use of the backs.

The salteries met with fair success this season. There was, however, a decrease in the pack, due largely to the fear of the packers that prices would not be as remunerative as in some earlier years, and later events justified these fears. There has been but little foreign

demand since the season ended and as a result the market has been rather weak.

The pickling and mild-curing plant of the San Juan Fishing and Packing Company, at Kenai, on Cook Inlet, was not operated this season, nor was the pickling plant of the Alaska Packers Association on the Ugashik River, in western Alaska.

Persons engaged.—This year 396 persons (of whom 237 were fishermen, 130 shoresmen, and 29 transporters) were employed, a decrease of 144 as compared with 1908.

PERSONS ENGAGED IN THE SALMON-PICKLING INDUSTRY IN 1909.

How engaged.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Whites	44	1	30	75
Indians	26	136	.....	162
Total	70	137	30	237
Shoresmen:				
Whites	11	6	43	60
Indians	24	39	3	66
Japanese	.....	.....	4	4
Total	35	45	50	130
Transporters:				
Whites	6	6	5	17
Indians	.....	12	.....	12
Total	6	18	5	29
Grand total	111	200	85	396

Investment.—There were 16 salteries (8 in southeast Alaska, 5 in central Alaska, and 3 in western Alaska) in operation, a decrease of 19 as compared with 1908. In addition some of the canneries and mild-curing plants also pickled their surplus catch, and while the product has been included in the present table the men and investment could not be separated from the statistics of the other branches of the industry.

INVESTMENT IN THE SALMON-PICKLING INDUSTRY IN 1909.

Item.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Salteries	8	.....	5	.....	3	.....	16	.....
Transporting vessels:								
Steamers and launches	9	$15,840	3	$17,334	3	$11,666	15	$44,840
Tonnage	83	.....	46	.....	15	.....	144	.....
Sailing	.....	.....	1	6,600	3	29,700	4	36,300
Tonnage	.....	.....	315	.....	1,391	.....	1,706	.....
Boats	53	3,155	58	2,145	32	2,215	143	7,515
Apparatus:								
Haul seines	9	1,260	26	2,800	.....	.....	35	4,060
Purse seines	5	1,600	.....	.....	.....	.....	5	1,600
Gill nets	5	500	.....	.....	13	620	18	1,120
Traps, stake	3	5,500	1	350	3	1,144	7	6,994
Traps, floating	1	700	.....	.....	.....	.....	1	700
Shore and accessory property	.....	44,000	.....	16,500	.....	37,000	.....	97,500
Total	.....	72,555	.....	45,729	.....	82,345	.....	200,629

Output.—The output amounted to 26,915 barrels and 6,997 half barrels, with a total value of $208,758, a decrease of 9,034 barrels, an increase of 750 half barrels, and a decrease of $143,949, as compared with 1908. The pack of humpback bellies fell off from 517 barrels and 2,346 half barrels in 1908 to 738 barrels in 1909. The pack of red salmon bellies fell off from 1,895 barrels in 1908 to 942 barrels in 1909. No dog salmon bellies were packed in 1908. Red salmon forms the bulk of the pack. Of the backs left after the humpback bellies had been packed 56 barrels were pickled.

QUANTITY OF SALMON PICKLED IN 1909, BY SPECIES.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Coho, or silver.....barrels..	202	$1,405	89	$810	27	$270	318	$2,485
Coho bellies.....do....	.....	.....	255	3,843	.....	.....	255	3,843
Dog, or chum.....do....	15	90	.....	.....	20	100	35	190
Humpback, or pink.....do....	1,557	9,405	.....	.....	.....	.....	1,557	9,405
Humpback bellies.....do....	688	6,938	50	500	.....	.....	738	7,438
Humpback backs.....do....	56	224	.....	.....	.....	.....	56	224
King, or spring.....do....	31	248	.....	.....	410	3,550	441	3,798
King, or spring, bellies.....do....	35	175	.....	.....	.....	.....	35	175
Red, or sockeye.....half barrels..	.....	.....	.....	.....	6,055	20,900	6,055	20,900
Do.....barrels..	.....	.....	2,189	17,319	21,291	129,079	23,480	146,398
Red bellies.....do....	.....	.....	942	13,902	.....	.....	942	13,902
Total.....half barrels..	.....	.....	942	.....	6,055	.....	6,997	.....
Total.....barrels.....	2,584	18,485	2,583	36,374	21,748	153,899	26,915	208,758

MILD CURING.

The packing of mild-cured salmon was confined this season to southeast Alaska, the plant of the San Juan Fishing and Packing Company, at Kenai, on Cook Inlet, central Alaska, not being operated. This business is proving one of the most attractive in southeast Alaska, where king salmon are to be found throughout the greater part of the year. The chief danger at present is that it may be overdone and the supply of kings seriously depleted.

The principal trouble the dealers experience at present is in getting rid of the white-meated king salmon with the least possible loss. These fish average about one-fourth of the total catch, and the fishermen insist that the dealers shall take them along with the others, which they do at a considerably lower price. Early in the season many of them are shipped fresh to the Puget Sound ports, but after the kings begin to run in the Sound this is unprofitable.

Persons engaged.—This year 521 persons (of whom 446 were fishermen, 55 shoresmen, and 20 transporters) were engaged in the mild-curing industry. A number of others also engaged in it for limited periods, but as their work in connection with other branches of the industry was more important they have been included with those.

PERSONS ENGAGED IN THE SALMON MILD-CURING INDUSTRY IN 1909.

Occupation and race.	Number.
Fishermen:	
Whites	236
Indians	206
Japanese	4
Total	446
Shoresmen:	
Whites	47
Indians	8
Total	55
Transporters:	
Whites	20
Grand total	521

Investment and products.—There were 11 fixed plants, i. e., plants with permanent buildings and a chief business of mild-curing salmon, operated in southeast Alaska this year. A considerable part of this industry is done by schooners and launches, which catch the fish in small boats and pack them aboard the vessels, and move from place to place with the schools of salmon. Some of these vessels also engage in the catching of halibut, or of salmon for the canneries. In the following tables, whenever these branches exceed in importance the mild-curing work of the vessels, the latter have been shown in the more important fishery, only the catch appearing in the table. The pack amounted to 2,292 tierces, valued at $149,300, an increase of 914 tierces and $71,489 over 1908.

INVESTMENT IN AND PRODUCTS OF THE SALMON MILD-CURING INDUSTRY IN 1909.

Items.	Number.	Value.
Fixed plants	11	.....
Transporting vessels:		
Steamers and launches	21	$47,880
Tonnage	190	.....
Boats	401	43,220
Apparatus, shore fisheries:		
Gill nets	154	20,450
Lines, trolling	.....	523
Shore and accessory property	.....	22,245
Total	.....	134,318

Apparatus and species.	Number.	Value.
Catch by apparatus:		
Gill nets—King salmon	47,136	.....
Lines—King salmon	83,777	.....
Total	130,913	.....

Products.	Pounds.	Value.
Tierces (2,292):		
Round weight of fish used	2,880,086	.....
Cured weight of fish used	1,833,600	$149,300

FRESH SALMON.

The demand from Puget Sound for fresh Alaska king salmon was excellent this year, and during most of the spring months the prices realized were very good. A considerable proportion of the shipments comprised white-meated king salmon and small red-meated kings which were not suitable or were in too great abundance to be used by the mild curers. The business was confined to southeast Alaska, and Ketchikan, Wrangell, Petersburg, Douglas, and Juneau were the principal shipping points.

During the course of the year 42,623 king salmon, valued at $39,707, were disposed of in a fresh condition, principally outside of the district. This was an increase of 6,337 fish over 1908. A considerable quantity of red, coho, and humpback salmon were also disposed of locally in a fresh condition.

MINOR PRESERVING PROCESSES.

Dry salting and drying.—At a few places in central Alaska the bellies of red and coho salmon are cut out and pickled, after which the backs are dried in the sun, and the resulting product, called "ukalu," used for fox food at the fox ranches.

The dry salting of dog salmon for food has almost ceased, but 71,600 pounds, valued at $1,038, being prepared. During the Russian-Japanese war this was quite an important industry.

Smoking.—A delicious smoked product, known locally as "beleke," is put up at Kodiak and several other places, the backs of red and coho salmon being utilized. A full description of the method of curing appears in the 1908 report of the salmon agents.

Freezing.—The only establishment engaged in freezing salmon is at Taku Harbor, in southeast Alaska. The species handled this year were coho and dog salmon. Other species of fish frozen were halibut, black bass, black cod, and steelhead trout.

MISCELLANEOUS FISHERY NOTES.

DISASTERS.

As the ship *Columbia*, under charter to the Alaska Salmon Company, which has a cannery on Wood River, a tributary of Nushagak Bay, was on her way from San Francisco to the cannery with the season's outfit and the canning and fishing crews, composed of 53 Italians, 96 Japanese, and 45 Americans and Scandinavians, she was driven on the eastern shore of Unimak Pass, about 6 miles from Scotch Cap light-house, early in the morning of April 30, and became a total wreck, the crews barely escaping. The *Columbia* was a full-rigged ship of 1,327 net tons, built in Bath, Me., in 1871. Her

dimensions were 205.9 feet length; breadth, 40 feet; and depth, 24 feet. She had been engaged in transporting cannery supplies for a number of years, and was owned by Capt. Henry Nelson, of San Francisco. As a result of this wreck the cannery of the Alaska Salmon Company was not operated this season, the time being too short to send up a new outfit.

The steam tug *Uyak*, of 12 net tons, which was employed in carrying salmon from the seines on Karluk Spit to the Uyak Bay cannery of the Northwestern Fisheries Company, was lost at Karluk during a terrific northeast gale on September 19. The crew narrowly escaped. The *Uyak* was built at Alameda, Cal., in 1901, and belonged to the company operating her.

KING SALMON FISHERY.[a]

King salmon began to appear in the lower part of southeast Alaska in March, but it was not until about the middle of April that they were found in any abundance. From then until about the middle of June, when fishing ceased in most places for about six weeks, the catch was very good. In May reports from Portland Canal were to the effect that a large run of kings had appeared there, but no effort was made to go for them. In July the kings were found to be numerous in Port Malmesbury, just inside Cape Decision, in Tebenkof Bay and in Gedney Harbor in Chatham Strait, on the west shore of Kuiu Island.

It is reported, with what truth we do not know, that king salmon are found in the deep pools of the Stikine River, also near the Hot Springs in the same river, in winter, and that the Indians cut holes in the ice and spear the fish.

The sportsmen of Ketchikan are agreed that the white-meated king salmon are gamier than the red-meated ones. The latter generally break water once and then go to the bottom, while the former remain near the surface and fight it out, breaking water five or six times.

One of the officers of the revenue cutter *Thetis*, on October 8, 1906, caught with hook and line, using artificial bait (Wilson spinner, single hook), from the wharf at Unalaska, four king salmon which weighed 29, 24, 22, and 20 pounds, respectively. They were all in fine condition and had been feeding on herring.

A white-meated female king salmon, caught with a trolling line and landed at Ketchikan about the middle of April, weighed 69¾ pounds, and measured 4 feet 6 inches from tip of snout to tip of tail and 18 inches across the widest part of the middle.

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[a] A detailed description of this fishery appears in the 1908 report of the salmon agents, Bureau of Fisheries Document No. 645.

Mr. H. C. Bergman reports that there was delivered to his mild-curing plant at Egg Island, near Klawak, a white-meated female king salmon which weighed, without the head, 101 pounds.

TROLLING FOR SALMON OTHER THAN KINGS.

Other species of salmon, in addition to the king, are found to take the trolling hook. For several weeks in July trollers in Union Bay, in southeast Alaska, caught a number of cohos and humpbacks while trolling for kings. The humpbacks were caught mainly with a spoon, no bait being used. Most of them appeared to have been feeding on needlefish and herring, according to the cutter who dressed them. A few red salmon are reported to have been caught on the trolling line by fishermen operating for king salmon in the neighborhood of Mary Island, near Dixon Entrance. Several fishermen report having in previous years frequently taken dog salmon on a hook in the bays along Chatham Strait.

SALMON IN SEAL'S STOMACH.

This spring the assistant fur-seal agent on St. George Island, upon opening the stomach of a seal killed on the island, found it full of salmon. The fact is worthy of note as being the first instance, at least in recent years, where the stomach of a seal killed on the islands has been found to contain food of any kind, owing to the seals' habit of digesting their food before coming ashore.

MARKED SALMON.

A cutter for the Pacific Coast and Norway Packing Company at Petersburg reported a king salmon this season which had a crescent-shaped piece cut out of the lower lobe of the tail.

During July and early in August an Indian fishing on Karta Bay, Prince of Wales Island, caught about 17 red salmon from which the adipose fin had been removed. He reported this to the superintendent of the cannery at Loring, who immediately sent out orders to his scowmen to keep such fish separate from the general lot, and as a result 5 more were brought to Loring previous to August 5. One of the present authors saw 2 of the marked fish on the latter date, one of which measured 26 inches and the other 29 inches in length.

At Yes Lake hatchery 4 adult redfish lacking both ventral fins were taken in the 1909 spawning run. These are returns from the Chamberlain marks of 1903, referred to in previous reports, and this is the fourth successive season during which a return has been received from this marking experiment. No return was obtained this

year, however, in Naha Stream itself, on which Fortmann hatchery is located and in which the original plant of marked fish was made.

For the first time a report has been received of a redfish lacking both ventrals taken outside of southeast Alaska. The Alaska Packers Association reports "several mature sockeye salmon" with these fins lacking at its Karluk hatchery during the 1909 spawning season. One of these was forwarded to the Bureau of Fisheries and on examination identified with the Chamberlain marked salmon. If it had been taken in the Naha or Yes Bay Stream, no question would have arisen over its identity as a marked fish, as the specimen does not differ essentially from the fish already recognized as marked returns. The great distance between the place where these fish were hatched and marked and the stream of the supposed return need not prevent a corresponding migration, but it is not to be inferred that there is any considerable interchange of this sort between these or other regions remote from each other.

The prolongation of the return from this very interesting marking experiment has been rather unexpected, and the next season's results will be awaited with additional interest.

FISHERY LAWS AND THEIR ENFORCEMENT.

NEEDS OF THE SERVICE.

The most urgent need of the Alaska salmon-inspection service is proper vessels for carrying on its work. In no part of Alaska are means of local communication other than very meager. The regular steamship lines visit only the more important points, and in some sections the calls of such steamers will not average more than one or two a month. Then, as they cover a wide area in their travels, the steamers can remain but a few hours at any one place, a time not sufficient for an inspector to look over the fishing grounds, which are usually off the regular line of travel. Even if these vessels were available, however, the inspectors should not be compelled to depend upon them, for the fishermen would in this event be able to prepare for the arrival of the vessel with the inspector aboard, and thus to conceal any illegality that might be in practice.

Owing to the lack of suitable vessels it was found impossible in 1908 and 1909 to inspect any of the fisheries of central Alaska. In these sections vessels of sufficient size and seaworthiness can not be chartered. In the protected waters of southeast Alaska launches can be used, but as they must, under present conditions, be chartered with their crews, it is almost impossible to prevent notification of the fishermen in advance. Frequently, also, when a launch is most needed, all of the few available will be under charter and the trip must be abandoned.

More inspectors, also, are needed in order to cover the territory properly. But it is useless to have these unless there are vessels available for their use. Under existing conditions the additional inspectors would merely be marooned for weeks at a time, and, as the salmon fishing season in central and western Alaska is comprised within four months' time at the most, almost nothing could be accomplished.

Three vessels are needed for this service. In southeast Alaska a comparatively small launch (about 60 feet long, 12 feet beam, and fitted with a 60-horsepower gasoline engine) would answer the purpose. In western Alaska a somewhat larger one would be required. For the work in central Alaska a much larger vessel is needed, one of at least 100 tons displacement, as the waters in this section are open and storms are frequent.

The Dominion of Canada, although having only about one-fifth as much coast line on the Pacific as Alaska, maintains two steamers, and is now building a third, for the purpose of protecting her fishing grounds.

COMPLAINTS AND PROSECUTIONS.

Two traps belonging to Mr. John L. Carlson (who operates a cannery at Taku Harbor), one located at False Point Retreat, on Mansfield Peninsula, Admiralty Island, and the other in Shelter Cove, on Shelter Island, were found by the assistant agent to be fishing during the weekly close season of July 3–5. Complaint was filed with the United States attorney at Juneau against the owner and the three watchmen in charge, Hans Andersen, Peter Antonick, and John Berich. At the preliminary hearing the United States commissioner discharged Mr. Carlson, as it was not satisfactorily proved that he had knowledge of the action of his men, but the watchmen were bound over to the grand jury. On August 21 the grand jury returned true bills against Hans Andersen and John Berich, the case against Peter Antonick having been dropped, as an investigation had developed that he was merely a temporary assistant to Andersen, the regular watchman. Upon arraignment in court on August 30 both defendants pleaded guilty and were fined $150 each and costs, which were paid.

Several Indians fishing in Karta Bay, Prince of Wales Island, having complained that one of the crews there had violated the weekly close season, an investigation was made, and as a result sworn complaint was made by the assistant agent before the United States commissioner at Ketchikan. George Kyan, an Indian, and his seine crew, all Indians, were arrested. At the preliminary hearing on July 19 George Kyan was held for the next grand jury meeting in Ketchikan, but the rest of the crew were discharged. As no grand jury was called for the October term in Ketchikan, the case had to go over until next year.

A pernicious method of fishing known as "jigging," which has been occasionally followed in Ketchikan Creek, was forbidden this year. In jigging a long line with a three-pronged grapnel is used, or else three heavy fishhooks tied back to back, at the end, and a heavy sinker secured on the line a short distance above the grapnel. In July and August the salmon are massed in the pool below the first falls and the fishermen throw the grapnel end of the jigger to the far side of the pool and then draw it back in a series of short, sharp jerks. The fish are so massed together that it is unusual when the hooks do not catch upon one or more salmon each cast. Most of them escape, however, terribly torn and mangled, and are frequently found dead at the bottom shortly after. As long as the few owners of this form of apparatus used it in securing salmon for their own use, the practice, though reprobated, was tolerated. It was discovered this season, however, that these jiggers were being rented to tourists while the steamers were lying at the docks, the tourists using them merely to catch the salmon for amusement, and leaving the carcasses usually to rot on the banks of the creek. The practice was therefore absolutely prohibited. In reality there never was necessity for this cruel form of apparatus, as the salmon are so abundant in the pools below the first falls that sufficient to supply all ordinary needs can be secured with the bare hands.

Another prohibition this year was against the tourists' practice of catching salmon with their hands as the fish struggle up the first falls in Ketchikan Creek. In many instances this has been done for the sole purpose of being able to boast of the feat, the fish being generally left on the banks to die. Sometimes, however, the fish are thought to be fit for food. As a matter of fact, all salmon found at the falls after about July 15 are practically worthless as food, although very valuable in keeping up the future supply if permitted to go on to the spawning beds.

As the salmon-fishing season was nearing its close, information was received that net fishing was being done in Eyak Lake and River. It is doubtful, under the law, whether this can be prevented unless these waters are set aside as spawning reserves, and in 1906 this action was recommended. The closing of the lake and river to commercial fishing would probably not seriously affect the packing interests, as the resources of the river have been so greatly reduced by excessive fishing in the past that they do not now afford a very material addition to the salmon supply of the region. Eyak Lake, is, however, one of the principal spawning regions in Prince William Sound, and should be protected to the fullest possible extent.

A letter from Golofnin Bay, Bering Sea, dated July 26, complained that the run of salmon in Fish River, a tributary of the bay, had become so depleted owing to hydraulic mining that the Eskimos who

had heretofore fished here for their own wants had been compelled to move down on the bay shore in order to carry on their fishery operations. In the latter place, during the last two years, according to the complaint, they have had to compete with Laplanders from Nome, who, by the use of large traps and gill nets, have so surrounded the small gill nets used by the natives that the latter have been unable to catch enough fish to provide for their wants during the winter months. As the complaint was received after the fishing season was over, nothing could be done in the matter this year.

LABELING OF CANNED SALMON.

Food inspection decision 105, issued March 10, 1909, by the board of food and drug inspection, Department of Agriculture, relates to the labeling of canned salmon and whitefish. As the subject is of importance to the canners of Alaska, that portion relating to salmon is reproduced herewith:

Many inquiries have been made of the Department regarding the nomenclature commonly employed in designating canned salmon. It is stated that inferior species of salmon are frequently canned and labeled with some name which is understood by the trade to indicate the presence of fish of an inferior variety, but which is not so understood by the consumer; as, for instance, "Alaska salmon." The Department is informed by the Bureau of Fisheries that the species of salmon in the United States are as follows:

1. *Oncorhynchus nerka.* Sockeye or sockeye salmon, blueback salmon, redfish, or nerka salmon.
2. *Oncorhynchus tschawytscha.* Chinook salmon, king salmon, quinnat salmon, tyee salmon, or spring salmon.
3. *Oncorhynchus gorbuscha.* Humpback salmon, pink salmon, or gorbuscha salmon.
4. *Oncorhynchus kisutch.* Coho salmon, silver salmon, or medium red.
5. *Oncorhynchus keta.* Calico salmon, keta salmon, dog salmon, or chum salmon.
6. *Salmo gairdneri.* Steelhead salmon, steelhead, hardhead, winter salmon, salmon trout, or square-tailed trout.
7. *Salmo salar.* Atlantic salmon.

Two additional species of landlocked salmon exist in certain New England and Canadian lakes. Neither of these nor the Atlantic salmon is ever canned. Considering this fact, and the further fact that many packers put up humpback and dog salmon under fancy names and thus sell them to consumers who may believe them to be of superior varieties, it is held that canned salmon should be labeled with one of the common names mentioned above as belonging to the species of fish canned.

LICENSE TAXES AND HATCHERY REBATES.

Under the provisions of the act for the protection and regulation of the fisheries of Alaska (approved June 26, 1906), the packers in Alaska are compelled to pay license fees or taxes on their season's output, as noted in the table following. The collection of these

license fees or taxes is in the hands of the clerk of the court of the judicial district in which the packer is operating. The law literally requires the packer to pay the license fee in advance, but as the fee is based upon the pack he makes, and it would be impossible in such an uncertain industry as fishing to estimate in advance exactly the quantity that will be packed, it is the custom to require the operator to apply for a license before beginning operations, and then at the end of the season make return of the amount due the district.

The following table shows the quantity of taxable fishery products prepared, the stated license tax on the product, and the total amount of tax received on each. It should be distinctly understood that the last item is merely approximate, being based upon returns on file at this Bureau, some of which are sworn and some estimated, and therefore perhaps varying somewhat from those sent to the clerk of the court. It is not probable, however, that the amount given will vary much either way from the correct amount as shown by the returns of the clerks.

LICENSE TAXES ON PREPARED FISHERY PRODUCTS.

Items.	Quantity prepared.	License tax.	Estimated amount of tax due.
Canned salmon	2,395,476 cases	4 cents per case	$95,819
Pickled salmon	33,441 barrels	10 cents per barrel	3,344
Mild-cured salmon	2,292 tierces [a]	40 cents per tierce	917
Dry-salted salmon in bulk	71,600 pounds	5 cents per 100 pounds	358
Fish oil	5,491 barrels	10 cents per barrel	549
Fertilizer [b]	1,155 tons	20 cents per ton	231
Total			101,218

[a] As the net weight of a tierce of fish is 800 pounds, this item is figured on a basis of 4 barrels to the tierce in working out the amount of tax.
[b] The fertilizer from whales has not been included.

Salmon hatching has been a more or less extensive enterprise of cannery proprietors ever since 1891, and the two larger establishments have been in operation continuously for nine and fourteen years past. Up to 1900 the work was entirely voluntary on the part of the packers. On May 2 of that year the following regulation was promulgated by the Treasury Department, which at that time had control of the Alaska salmon-inspection service:

7. Each person, company, or corporation taking salmon in Alaskan waters shall establish and conduct, at or near the fisheries operated by him or them, a suitable artificial propagating plant or hatchery; and shall produce yearly and place in the natural spawning waters of each fishery so operated red salmon fry in such numbers as shall be equal to at least four times the number of mature fish taken from the said fisheries, by or for him or them, during the preceding fishing season. The management and operation of such hatcheries shall be subject to such rules and regulations as may hereafter be prescribed by the Secretary of the Treasury. They shall be open for inspection by the

authorized official of this Department; annual reports shall be made, giving full particulars of the number of male and female salmon stripped, the number of eggs treated, the number and percentage of fish hatched, and all other conditions of interest; and there shall be made a sworn yearly statement of the number of fry planted and the exact location where said planting was done.

On January 24, 1902, this regulation was amended so as to require the planting of "red salmon fry in such numbers as shall be equal to at least ten times the number of salmon of all varieties taken from the said fisheries."

Although the regulation was mandatory, but few of the packers obeyed it, some because no suitable place was to be found within a reasonable distance of their plants, others because the establishment and operation of such a hatchery would cost more than their returns from the industry justified, while still others absolutely ignored it. A few continued to operate the hatcheries they had established prior to the promulgation of the regulation in question, and even established new ones, so as to conform more closely to its requirements. But as a result the packers who obeyed the regulation were placed under a heavy financial handicap. They were compelled to pay all the expenses of keeping up and operating their hatcheries, and at the same time to pay the regular license fees or taxes on their pack of fishery products, while those who evaded or disobeyed the law merely paid the license tax.

The injustice of this arrangement was patent on its face, and when in 1906 a comprehensive revision of the law was made by Congress provision was made for reimbursing in the future those cannery men who operated salmon hatcheries. The section covering this point reads as follows:

SEC. 2. That the catch and pack of salmon made in Alaska by the owners of private salmon hatcheries operated in Alaska shall be exempt from all license fees and taxation of every nature at the rate of ten cases of canned salmon to every one thousand red or king salmon fry liberated, upon the following conditions:

That the Secretary of Commerce and Labor may from time to time, and on the application of the hatchery owner shall, within a reasonable time thereafter, cause such private hatcheries to be inspected for the purpose of determining the character of their operations, efficiency, and productiveness, and if he approve the same shall cause notice of such approval to be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein any such hatchery is located, and shall also notify the owners of such hatchery of the action taken by him. The owner, agent, officer, or superintendent of any hatchery the effectiveness and productiveness of which has been approved as above provided shall, between the thirtieth day of June and the thirty-first day of December of each year, make proof of the number of salmon fry liberated during the twelve months immediately preceding the thirtieth day of June, by a written statement under oath. Such proof shall be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein such hatchery is located, and when so filed shall entitle the respective hatchery

owners to the exemption as herein provided; and a false oath as to the number of salmon fry liberated shall be deemed perjury and subject the offender to all the pains and penalties thereof. Duplicates of such statements shall also be filed with the Secretary of Commerce and Labor.

It shall be the duty of such clerk or deputy clerk in whose office the approval and proof heretofore provided for are filed to forthwith issue to the hatchery owner, causing such proofs to be filed, certificates which shall not be transferable and of such denominations as said owner may request (no certificate to cover fewer than one thousand fry), covering in the aggregate the number of fry so proved to have been liberated; and such certificates may be used at any time by the person, company, corporation, or association to whom issued for the payment pro tanto of any license fees or taxes upon or against or on account of any catch or pack of salmon made by them in Alaska; and it shall be the duty of all public officials charged with the duty of collecting or receiving such license fees or taxes to accept such certificates in lieu of money in payment of all license fees or taxes upon or against the pack of canned salmon at the ratio of one thousand fry for each ten cases of salmon. No hatchery owner shall obtain the rebates from the output of any hatchery to which he might otherwise be entitled under this act unless the efficiency of said hatchery has first been approved by the Secretary of Commerce and Labor in the manner herein provided for.

While the efficiency and productiveness of the private salmon hatcheries must be favorably certified to by the agents of this Department before they become eligible to participate in the provisions of the law, the passing upon the correctness of the returns made by the hatchery men, the issuance of the rebate certificates and their receipt later in payment of license fees or taxes are matters solely within the province of the clerk of the court of the judicial district in which the hatchery is located, the law merely requiring the owner to forward to the Department a sworn copy of his report to the clerk.

The following table shows the name of owner, location of each private salmon hatchery operated during the fiscal year ending June 30, 1909, the number of salmon (all reds) liberated, and the amount of rebate certificates due each hatchery:

Rebates Credited to Private Salmon Hatcheries in 1909.

Owner.	Location.	Salmon fry liberated.	Rebate due.
Alaska Packers Association	Naha Stream	22,785,000	$9,114
	Karluk Stream	37,105,000	14,842
Northwestern Fisheries Co	Quadra Lake	3,025,750	1,210
	Hetta Lake	8,143,000	3,257
North Pacific Trading and Packing Co	Klawak Lake	3,200,000	1,280
Total		74,258,750	29,703

In addition to the private salmon hatcheries the United States Bureau of Fisheries during the same period operated two hatcheries—one at Afognak, in central Alaska, and the other on Yes Lake, in

southeast Alaska—and planted salmon fry as follows: From Afognak, 39,325,870 red salmon fry and 10,000 humpback salmon fry; from Yes Lake, 48,653,000 red salmon fry and 9,900 coho fry; a total of 87,998,770 fry for both hatcheries.

OBSERVATIONS ON WOOD RIVER.

THE ORDER CLOSING WOOD AND NUSHAGAK RIVERS.

The order of December 19, 1907, closing Wood and Nushagak rivers, in western Alaska, to commercial fishing was strictly enforced during the two past seasons, and no trap was operated or other form of fishing carried on in either river. There were 10 fish traps in operation on the bay during the whole or a part of the season just past, but 2 of these had very small takes. This number is 1 trap fewer than in 1908.

It is plain that the great variation from year to year in the proportion of the annual run taken by the fishermen is unfavorable to uniformity in the run and that the lesser runs are much more heavily fished than the greater, a condition which in the Nushagak region certainly tends to overfishing. The order closing the rivers provides a partial check on overfishing and is especially useful in seasons of small runs. During the season of 1908 it had no effect in limiting the catch, since the packers had little difficulty in completely filling their packs from the fishing in the bay. In 1909, however, the run was much smaller, and not all the canneries completed their packs. Had traps been permitted in the rivers they would have secured a large number of the relatively few fish which, as it was, succeeded in escaping to the spawning grounds by way of Wood River. When runs occur large enough to fill readily the whole pack provided for by the cannery men, the order has no restrictive influence on the catch, but is not oppressive, since at somewhat greater trouble all the fish necessary may be obtained from the bay.

Under the present system of fishing the order is a necessary protection to the fisheries, and is a wise exercise of the power conferred by the Alaska fisheries law.

COUNT OF THE BREEDING RUN IN WOOD RIVER.

The counting investigations begun in 1908 were continued on substantially the same basis during the season of 1909. A rack was placed across the foot of Lake Aleknagik and an actual tally was made at the three gates provided for the purpose of all red salmon entering the lake during the season. The total run into the lake fell far short of the preceding season, being 893.000, as against 2,600,000 in 1908.

The first visit to the lake was made June 7, when from an examination near its foot it appeared to be clear of ice, whereas on May 31, 1908, it was still almost entirely covered. The work of installing the rack was begun June 17 and the temporary crew was taken away on the 22d. The rack was not made entirely tight until the 2d of July. The few salmon first appearing, however, show no tendency to seek the apertures under the chain at the bottom of the web, but find their way readily through the gates. The same or greater trouble was encountered with the floating drift as in the previous season. This drift is composed of dead leaves, grass, twigs, and small limbs of trees set afloat from the shore by the rise of the lake and brought down by the current and favorable winds. It arrived at the salmon rack in greatest abundance between June 26 and July 2, and during this period strenuous exertions on the part of the crew were necessary to keep the web sufficiently clear to relieve the pressure against the piles. As it was, several of these were bent over and had to be held by guy lines. The drift gradually lessened in amount and finally disappeared almost entirely.

The first tally was made June 28 and the last on August 1, the gear being taken out the next day. In 1908, with a large run and the necessity of developing methods of making a proper and at the same time rapid approximation of the numbers, it was thought necessary to estimate from the frequent and regular tally of a uniformly flowing stream of fish. During the present season no estimates of any sort were made. The much smaller run and the fact that three gates were available made an exact count a comparatively easy task. To a certain degree this year's figures corroborate the count of the preceding season, for the daily quotas during the height of the run are consistent with each other during the two seasons, and it was obvious by mere inspection of the daily abundance about the gates that the 1909 run did not approach that of 1908. It is probably possible to make an actual tally in any season, even of the largest runs. The salmon may be held below the rack without injury for a time, and by increasing the number of tally gates the fish may be delivered more rapidly. It is merely a question of a sufficiently strong and tight barricade, with plenty of gates and tallymen.

An interesting coincidence is seen in the fact that the highest daily tally, the crisis or height of the run, occurred on the same day of the month, July 14, in each of the two seasons. While this height of the run will probably be found to occur usually near the middle of July at the lake with as much regularity as the entrance of the run into the bay, which usually occurs about the first of July, it is not to be expected to recur continually on any given date. It is suggestive,

however, to compare this height of the salmon run with the so-called "height of the season" among the fur-seal rookeries on the Pribilof Islands, which occurs about the same time, marking the high tide in the rookery life of the season.

There were two well-recognized runs on the bay, the first occurring July 3 and the second July 11. In each case the run was heavy for the time being, but dwindled rapidly, leaving the canneries after a few days of good fishing to "scrape" for the rest of the season. The daily tally at the salmon rack shows that these two runs remained distinctly separate when the fish reached the lake. Stragglers only were passing the rack up to July 5, and on that date the first run in force arrived at the lake. This run, though falling rapidly, lasted three days. After an interval during which few fish arrived, the vanguard of the second run reached the lake late on the 12th and was in full force on the 13th. It lasted about a week, subsiding more slowly and gradually than the first run. In each case the run passed from the lower bay to the lake within two days, while in 1908 it is certain that from six to nine days were consumed by the head of the main run in making the same trip.

Daily Tally of Redfish into Lake Aleknagik, Alaska, during the Season of 1909.

June 28	18	July 17	42,004
June 29	20	July 18	38,050
June 30	425	July 19	17,960
July 1	1,261	July 20	10,826
July 2	809	July 21	8,150
July 3	485	July 22	2,497
July 4	1,583	July 23	3,139
July 5	54,135	July 24	3,000
July 6	43,010	July 25	8,088
July 7	29,319	July 26	4,390
July 8	4,555	July 27	5,193
July 9	3,408	July 28	1,142
July 10	11,340	July 29	395
July 11	586	July 30	39
July 12	28,299	July 31	607
July 13	100,350	August 1	358
July 14	189,610		
July 15	177,002	Total	893,244
July 16	101,191		

Significance of the figures.—The count in Wood River shows an enormous falling off in the spawning run as compared with the preceding season—893,000 as against 2,600,000. The catch of the fishermen on the whole bay likewise fell off, but to no such extent—

4,900,000 as against 6,400,000. The 1909 Wood River run was 34 per cent of the 1908 run; the 1909 Nushagak Bay catch was 76.5 per cent of the 1908 catch.

The relations of the whole redfish runs in Nushagak Bay for the two seasons do not appear so definitely, but it is certain that there was a great falling off. If the catch and the Wood River run—the two accurately known factors—are added together for 1908 and for 1909, the latter is 64 per cent of the former. These totals give in each year the whole run minus the escape up Nushagak, Igushik, and Snake rivers, which has never been counted. The conditions which reduced the run up Wood River apply more or less exactly to the other rivers, and the proportion given may be taken as approximating the size relation of the two annual runs. It may be checked by another method of estimation.

A numerical approximation of the whole 1909 run may be obtained by the method used for the 1908 run and detailed in the 1908 report. Reducing the 1908 maximum and minimum estimates for Nushagak, Igushik, and Snake rivers in the same proportion that the Wood River run has been reduced, adding in each case the Wood River run and the catch on the bay and averaging the two totals, nearly 6,800,000 is obtained as an estimate of the total run of red salmon into Nushagak Bay in 1909. This is 57 per cent of the corresponding 1908 estimate, and thus it is safe to say that the current run was between 57 per cent and 64 per cent of the 1908 run. Of this total of nearly 6,800,000 fish, 85 per cent have been actually counted (Wood River run and the catch), and it is plain that the estimate is not a guess. The 1909 run was not fewer than 6,200,000 and not more than 7,400,000. The escape to the spawning grounds was between 20.5 per cent and 34.3 per cent of the whole run.

If the number escaping to the spawning grounds in 1909 is just sufficient to maintain the run which entered the bay, the rate of increase is between 200 per cent and 400 per cent, depending on which of the extreme estimates, maximum or minimum, is taken as a basis. Considering the relation of take to escape in the past two seasons and the strong presumption of a slowly declining fishery, this 1909 escape is probably insufficient, and 400 per cent is a safe extreme as a possible rate of increase. From the results of the 1908 investigations 100 per cent seems a certain minimum. We may therefore conclude that the Nushagak region during recent years is reproducing red salmon by natural propagation at a rate of increment not lower than 100 per cent nor greater than 400 per cent. In other words, for every salmon reaching the spawning grounds, from two to five return several years later, and of these returning salmon from one to four (the increment)

may be taken by the industry without reducing the productivity. It is to be remembered that these figures represent highly probable extremes and that the present actual rate of increase is somewhere intermediate.

It would be necessary only to count the escape in both Nushagak and Wood rivers for several years to arrive at practically accurate knowledge of the rate of increase for the Nushagak region. The two minor rivers carry so small a part of the total that estimates made from a knowledge of fishing experience in them are entirely sufficient to prevent important error. This rate of increase may, then, be expected to apply without great modification to other red salmon fisheries.

These calculations assume in theory that all the progeny of the spawning grounds of the Nushagak basin, and no others, return as adults to Nushagak Bay. This is not entirely true, for chance and physical conditions probably determine to some extent which individuals and how many shall diverge from their course up Bristol Bay and enter Nushagak Bay instead of continuing to the fisheries at the head of Bristol Bay. There must be some interchange between the several regions of Bristol Bay fisheries. As affecting the determination of the rate of increase this is a difficulty which at present can not be met. It need occasion no anxiety, for it is almost obvious that in the long run regions such as the Nushagak depend on their own spawning grounds for maintenance. The exchange between the fisheries is reciprocal.

Miscellaneous observations.—As in 1908, all species of Pacific salmon were seen at the lake, also several other species of fishes. Salmon other than red salmon were many fewer than during the preceding year and were unimportant in either season. The Dolly Varden trout was also less numerous.

A tally of the salmon showing the twine marks of the gill nets was made on several different days at times of both light and heavy runs. The percentage of twine-marked fish ranged from 2 per cent at the height of the run up to 15.6 per cent on July 19, the last day on which such a count was made. These percentages were somewhat higher in 1908, though the proportion of the run taken was smaller.

One of the most important and impressive differences between the two seasons, observed during the examination of the lake and its creeks and of Wood River, was in the abundance of salmon fry. No one familiar with the waters in both seasons could fail to be impressed by the great increase in the number of small redfish fry—young of that season—during the 1909 summer as compared with the previous one. They were caught in the muddy waters of the upper

bay in May, some with the sac still unabsorbed. They were seen in many places in Wood River. At the native village at the foot of the lake there were swarms of them, and they existed in the lake in various places along its shore, not only off the mouths of creeks but in localities distant from the nearest salmon-carrying creek. In one case they were in numbers on the flats about one of the islands, which they must have reached by crossing deep water, if not spawned directly in the open lake about the island. No such abundance of fry was seen in 1908. The two parent runs of adults readily explain the difference, that of 1907 being unusually small, that of 1908 unusually large, and the corresponding spawning quotas probably even more disproportionate.

The yearlings in their downward migration were frequently seen near shore at the rack, but the chief evidence of their presence was given by the arctic terns, which made almost nightly forays on the passing schools. The web of the salmon rack probably interrupted or delayed the progress of the young salmon, and the terns used the tops of the piles as resting places for observation. They seldom fed much during the day, but were abundantly in evidence late in the evening as the daylight became dimmer.

Compared with the preceding season but few dead fish were found in the vicinity of the rack. The ragged and injured salmon toward the end of the run occurred in about the usual proportion. Bacteriological culture plates were made from the blood of spent salmon after their natural death, but only negative results were obtained. It appears unlikely that the dying spent salmon have uniformly a terminal infection, as has been thought.

The weather during the six weeks ending about August 1 was noteworthy for many bright, warm days. There were no blows as heavy as during the preceding summer. Careful measurements were made to determine the date of seasonal high water in the lake. The highest level was reached June 19, and the fall began within two days. Apparently the water reached about the same level as in 1908. The fall was very slow at first. The rains interrupted the fall, but never occasioned more than a very slight rise during the season. The total fall during the forty-nine days following June 21 was about 41 inches.

TEMPERATURE RECORD AT SALMON ROCK AT LAKE ALEKNAGIK, ALASKA, SUMMER OF 1909, IN FAHRENHEIT DEGREES.

Date.	Air.			Water.			Air.		Lake level.[a]	Remarks.
	8 a. m.	Noon.	6 p. m.	8 a. m.	Noon.	6 p. m.	Max.	Min.		
	°	°	°	°	°	°	°	°	*Inches.*	
June 7	.....	.....	.....	[b]38	.....	.....	.....	.....	.....	1 mile above lagoon.
17	.....	.....	.....	39.5	.....	.....	.....	.....	.....	Rainy.
18	.....	.....	.....	40	.....	.....	.....	.....	.....	Rain a. m., clearing.
19	.....	.....	.....	.....	.....	[c]41	.....	.....	.....	Cloudy a. m., bright sun, warm p. m.
20	.....	52	50.5	39.5	41	40.5	57.5	.....	.....	Light clouds, some sun, trace of rain.
21	51	51	57	41	42	43	60.5	37	.....	Light clouds, sun, showers.
22	35	52	52	41	42.5	41	62.5	34	.....	Bright sun, showers p. m., thunder.
23	44.5	47	52	41	41	43.5	58	39	.....	Cloudy a. m.; showers; sun p. m.
24	47	50	52	41	41.5	42	55	36	.....	Cloudy, rain, some sun.
25	44	58	56.5	41	45.5	46.5	60	41	.....	Bright sun.
26	45	65	58.5	42.5	46	45.5	69.5	38	.....	Do.
27	50	65	58	41.5	49	42	68	37	.....	Do.
28	51	58	60	41.5	43.5	43.5	70	44	4¼	Do.
29	51.5	52	49.5	42.5	41	48	54.5	43	.....	Partly cloudy, stiff westerly breeze.
30	48.5	54	51.5	47	48	48	62.5	41.5	.....	Sun, light clouds, westerly winds.
July 1	55	.....	58	44.5	.....	.....	68	35.5	6	Bright sun.
2	52	69	65	44.5	44	45.5	71	43	.....	Bright sun, westerly breeze in p. m.
3	49	53.5	46	44	44.5	45	54	46	.....	Cloudy, rain p. m., easterly breeze.
4	47	48.5	49	42.5	42.5	43	53.5	43.5	8	Rain nearly all day.
5	51	57	53.5	44	44	42.5	59.5	45	8	Cloudy till evening.
6	54.5	56.5	54.5	42.5	43	43	62	42.5	8½	Partly cloudy, intermittent easterly breeze.
7	52.5	53	52.5	42.5	43	43	58.5	46	9	Partly cloudy a. m., rain p. m.
8	49	56	56	42.5	44	43	58.5	46	10	Rain a. m.; partly cloudy p. m.
9	56.5	61	60	44	44.5	44	66	46	11	Partly cloudy, showers.
10	50.5	56	62.5	45.5	45.5	46.5	66.5	44	12	Partly cloudy, faint thunder, showers.
11	51.5	51	50	46.5	48	48	55	49	12¾	Rain nearly all day.
12	46	48.5	51	45.5	44	45.5	51.5	45	12½	Rain a. m., cloudy p. m., southeast wind.
13	48	.....	60.5	43	.....	47	67.5	44	13	Bright sun.
14	51	64	71.5	46.5	47	52.5	76	41.5	14	Bright sun, westerly wind in evening.
15	55.5	69 5	70	51	52	53	73	44	15	Bright sun.
16	53	57	51	51.5	52.5	51	57	50.5	.....	Cloudy, southwest breeze.
17	50.5	57	55.5	51.5	53	53.5	61.5	47.5	.....	Cloudy, some sun in evening.
18	50	57	62.5	50.5	53	52.5	65	46	18	Do.
19	62.5	75	73	49.5	53	53.5	80.5	54	19½	Hot, bright sun.
20	59	69.5	74	52.5	55	59	82.5	52.5	21	Do.
21	61	69	75.5	52.5	55	58	82	49.5	22.5	Do.
22	57	70	73	51	56	52	80	49.5	.....	Do.
23	57	69	71	50	55	55	.....	48	25.5	Do.
24	52.5	57	58.5	50	50	46.5	64.5	47.5	.....	Cloudy; some sun; light rain.
25	50.5	52	55	44	45	48.5	57.5	47.5	27	Cloudy; rain a. m.
26	52	60.5	62	46	49	46	64.5	48	28½	Partly cloudy; some sun.
27	49	55	60	49.5	50.5	53	64.5	47.5	29¼	Do.
28	53	57.5	61	50.5	50	52.5	61.5	50	30¾	Cloudy.
29	50	53.5	61	51	51.5	51.5	61	48	31¾	Partly cloudy.
30	56	65.5	72.5	51.5	55	56	78	46	33	Bright sun, easterly wind in evening.
31	51	53.5	54.5	54	54	54.5	55	50	34¼	Cloudy; rain p. m.
Aug. 1	48.5	.....	55	53.5	.....	52.5	57.5	47.5	.....	Rain nearly all day.

[a] Highest level was reached June 19. Beginning of fall June 21. Between June 21 and June 28 the lake fell 4¼ inches. The readings given are in inches below the level of June 19.

[b] 9.30 a. m.

[c] 7.30 p. m.

THE COD FISHERY.

With one exception, all of the firms and individuals operating in the district for cod exclusively have their headquarters at Seattle, Anacortes, or Tacoma, Wash., and San Francisco, Cal., at which places, or in their immediate vicinity, the kench-cured fish are received and prepared for marketing. Some firms have shore stations located at favorable places in central Alaska, from which the dory fishermen carry on their fishing operations, bringing in the catch daily. These operators also have vessels which engage in fishing on the banks in the North Pacific Ocean and Behring Sea, and are also employed in transporting the kench-cured fish to the curing plants at the home ports.

It has been known for some time that cod were abundant around St. Lawrence Island, in the northern part of Bering Sea, and the Bureau of Education in 1907 seriously considered sending an experienced salter to its station on that island for the purpose of instructing the natives how to cure the fish for the white trade, but for various reasons the project was not carried out. If these cod could be prepared properly, there would be a good demand for them in Nome and St. Michael, both of which are securing their supplies from the Siberian coast at present. One of the best banks around the island is about 10 miles north-northeast from Cape Chibukak.

The commander of the United States revenue cutter *Thetis*, in a letter dated November 19, 1909, reports that he heard of a cod bank "to the westward of Shishmaref Inlet in the Artic Ocean. A former resident of Shishmaref Inlet told me that he had seen large numbers of cod in the vicinity of the hot springs at the head of that inlet in the fall of the year when ice was forming."

Mr. John Nelson, of Squaw Harbor, took up the preparation of stockfish at his new station this year. In curing, the fish are hung over wires, with the skin side up to shed the water and allow the flesh to dry. In the damp climate of Alaska the fish rot when placed with the flesh side up, as has been done heretofore. Only a small quantity of stockfish was prepared, and this was packed in bundles containing 100 fish each, with an average weight of 100 pounds. The packages were wired and burlapped at each end. If the experiment proves profitable, it will be prosecuted more vigorously next year.

SHORE STATIONS.

During 1909 the following shore stations were operated: By the Alaska Codfish Company, at Company Harbor and Moffat Cove, Sannak Island; Unga, Baralof (Squaw Harbor), and Kelley Rock (Winchester), Unga Island; and Dora Harbor, on Unimak Island.

John H. Nelson, at Baralof (Squaw Harbor), on Unga Island. Pacific States Trading Company, at Northwest Harbor, Little Koniuji Island, and Ikatik, on Unimak Island. Seattle-Alaska Fish Company, at Baralof (Squaw Harbor), on Unga Island. Union Fish Company, at Pirate Cove, Popof Island; Northwest Harbor, Little Koniuji Islands: Eagle Harbor and Sanborn Harbor, on Nagai Island; Unga, on Unga Island; Pavlof Harbor and Johnson Harbor, on Sannak Island; and Dora Harbor, on Unimak Island. Some of these stations were operated only during the winter of 1908–9. The Alaska Commercial Company prepared a considerable quantity of codfish at Kodiak.

STATISTICS.

During the year 185 fishermen and 28 shoresmen were employed at the stations, while 54 transporters were employed in operating transporting vessels in Alaska and between the Alaska stations and the California and Washington home stations.

The following tables show the condition of the industry in 1909:

INVESTMENT IN THE CENTRAL ALASKA COD FISHERIES IN 1909.

Items.	Number.	Value.[a]	Items.	Number.	Value.[a]
Transporting vessels:			Apparatus:		
Steamers and launches	2	$25,500	Hand lines		$1,975
Tonnage	47		Trawl lines		600
Sailing	5	61,600	Stations, with accessory property	20	63,200
Tonnage	1,137				
Boats	282	10,930	Total		163,805

[a] Includes outfit in the case of vessels.

PRODUCTS OF THE CENTRAL ALASKA COD FISHERIES IN 1909.

Products.	Round weight.	Dressed weight.	Value.
	Pounds.	*Pounds.*	
Cod, fresh	5,900	4,720	$237
Cod, salted (kench-cured)	4,441,925	3,331,444	116,601
Cod, salted (stockfish)	45,000	13,000	1,200
Cod, pickled	5,133	3,700	183
Cod tongues, salted		5,900	600
Total	4,497,958	3,358,764	118,821

VESSEL FISHING.

The following fleet [a] of 14 vessels, with headquarters in California and Washington, operated in Alaskan waters this year, several of them spending the winter of 1908–9 in the North:

[a] None of the data relating to this fleet appears in the statistical tables.

Name.	Class.	Tonnage.	Owner.
Fanny Dutard	Scow	252	J. A. Matheson, Anacortes, Wash.
Harriet G	Brig	188	Do.
Alice	Schooner	220	Robinson Fisheries Co., Anacortes, Wash.
Joseph Russ	do	235	Do.
Maid of Orleans	do	171	Seattle-Alaska Fish Co., Seattle, Wash.
Harold Blekum	do	185	King & Winge, Seattle, Wash.
Vega	do	233	Do.
Fortuna	do	138	Blom Codfish Co., Tacoma, Wash.
Czarina	do	218	Union Fish Co., San Francisco, Cal.
Ottillie Fjord	do	247	Do.
Stanley	do	253	Do.
City of Papeete	Barkentine	370	Alaska Codfish Co., San Francisco, Cal.
John D. Spreckles	Schooner	253	Do.
W. H. Dimond	do	376	Do.

The only change from last year was the dropping out of the *Ivy* (135 tons), which had been chartered by the Union Fish Company during 1908. Most of the fleet met with excellent luck this year and found fish so plentiful that some of them returned several weeks earlier than usual. The schooner *Joseph Russ* made the record catch, bringing home 204,155 fish, all of which were taken, dressed, and salted in fifty-eight days.

While fishing from their dories in Unimak Pass, six of the crew of the *Harriet G* were caught in a sudden blow and driven on the rocks and drowned before they could reach the shore. Two other men who were with the party were saved by a United States lighthouse tender, which later delivered them aboard their vessel.

Early in the summer the schooner *Czarina*, while fishing in Bering Sea, was blown ashore and for ten days remained on a sand spit. She sustained but slight damage, however.

The vessels from Washington operating in Alaska waters caught 1,147,605 fish, while those from San Francisco caught 520,000, a total of 1,667,605.

In 1908 a fleet of three San Francisco vessels operated in the Okhotsk Sea and caught 445,000 fish. This year but one vessel, the barkentine *Fremont* (328 tons), owned by the Union Fish Company, of San Francisco, visited these grounds. She returned with a catch of 80,000 fish. Her captain reported a large fleet of Japanese vessels fishing there for cod.

THE HALIBUT FISHERY.

The season of 1908 was fairly good, and would have been much better had it not been for the scarcity of bait during portions of the best of the fishing season. For days at a time during the winter vessels had to tie up owing to the impossibility of securing either fresh or salted bait. The question of bait supply has been treated of more fully under the herring fishery.

A NEW FREEZING PLANT AT KETCHIKAN.

The most important and interesting event in the halibut industry this year was the opening in September of the plant of the New England Fish Company at Ketchikan, the finest freezing and cold-storage plant on the Pacific coast. Late in the fall announcement was made that the company's plant at Vancouver, British Columbia, and its two Canadian vessels had been sold to the Canadian Fishing Company (Limited), of Vancouver.

Since the New England Fish Company first began operating on this coast it has had its headquarters at Vancouver, where it outfitted its vessels and prepared their catches for shipment in bond, free of duty, to markets in this country. It operated three vessels with American register and two with Canadian register, the catches of the latter being marketed mainly in Canada, or, when shipped to the United States, paying the regular duty. For several years there has been developing in Canada, and more particularly in British Columbia, a decided opposition to the company, the claim being that it had no rights in British Columbia waters and was deriving a profit that should go to Canadian fishing enterprises. The knowledge of this feeling on the part of the Canadians, and the probability that it would eventually crystallize into some official action, doubtless had considerable weight in the company's decision to establish its plant at Ketchikan.

Other factors influencing the company, and probably the controlling, were (1) the nearness of Ketchikan to the fishing banks, thus enabling the vessels to visit the banks and return in less than one-fourth the time heretofore consumed when Vancouver was the headquarters, and delivering the fish in much fresher condition; (2) the probable opening, in two or three years, of the transcontinental line of the Grand Trunk Railway to Prince Rupert, British Columbia, a port but 92 miles from Ketchikan, by means of which shipments can be made in bond to eastern United States markets in the same time required to cover the distance from Vancouver, the Pacific terminus of the Canadian Pacific Railway, thus saving the coastal run from Dixon Entrance to Vancouver, a distance of 475 miles; and (3) the opportunity to handle the catches made by the large fleet of power and sail vessels and launches during the fall, winter, and early spring months on the banks in the sheltered waters of southeast Alaska.

The site of the new plant in Alaska is at a point on Tongass Narrows about one-half mile from the center of the town of Ketchikan, and this has been named Belanna. The location is on deep water, thus permitting vessels to tie up at the dock at any stage of water.

Work was begun on the buildings in 1908 and was pushed forward as rapidly as the weather would permit.

There are six buildings in the plant at Belanna and three at the power station on George Inlet. The main building at the former place, containing the freezers and storage rooms, is 85 feet by 95 feet and two stories high. The receiving house is 60 by 70 feet and also two stories high. The ice plant is one story in height and 72 by 25 feet, while the power house is 40 by 50 feet. In the rear is a commodious office building. All the working buildings are of wooden construction of the heavy joisted type. The outside surface is covered with vertical matched sheathing with battens over the joists, while all floors, partitions, and walls are insulated with sheet cork with wood insertion and nailed direct to the boarding or joists. It is estimated that the whole plant cost $250,000.

Inclosing a section of the wharf and located in the foreground in close proximity to the freezer is the receiving house, in which the fish are to be washed and dressed in their transit from the vessels to the freezer. After washing and cleaning they are sent to the freezer building, a short distance in the rear. Here there are four freezers each 25 feet by 10 feet 6 inches, in which a temperature of from 25° to 30° F. below zero can be maintained if desired, although it is probable that a temperature of not more than 10° below zero will be required. All freezing is by direct expansion, and each freezer is piped with about 2 feet of 1¼-inch pipe per cubic foot of freezing space. The bunkers in the freezers are in pairs, each nine pipes wide, spaced on 5-inch centers, and nine tiers high, spaced 10 inches apart. This leaves a 3½-foot passage through the center of each freezer opposite the 3½ by 6½ foot serving doors. The large halibut, owing to their size, are placed directly on the tiers of pipes instead of in pans, as is the custom with the smaller fish.

After freezing, the fish are passed through openings in the rear of the freezers into the glazing room, where, after glazing, they are crated and trucked into the storage rooms in the rear half of the first story and the entire second story. It is estimated that the six storage rooms have a capacity of 1,500 tons of fish. The storage and glazing rooms are piped with 1 linear foot of 2-inch pipe per 10 cubic feet of space. The storage rooms will have a temperature of 10 degrees above zero.

The fish are raised to the second-story storage rooms by a 2-ton electric elevator. Shipments of boxed fish are made from the second floor down an incline to the wharf level.

For the purpose of developing power for the plant a 15-foot dam was constructed at the outlet of Lake Whitman, a small lake just inside George Inlet. From here a 36-inch pipe line taps the lake

at a depth of 15 feet in order to get the coolest water and so that no trouble shall be experienced with driftwood or ice. The pipe line is about 3,300 feet in length and enters the power house on a small bay on the inlet. Here a three-phase system of two generators has been installed, each developing 1,000 horsepower. A right of way between the power house and the plant at Ketchikan was cleared and over this was constructed the transmission line of a little less than 5 miles in length.

To protect the buildings from fire, a 500-gallon fire pump has been installed, which has an 8-inch suction from the harbor and discharges into a 6-inch main inclosing the entire group of buildings. From this main seven two-way hydrants are supplied, these hydrants being so located and equipped with fire hose, etc., located in the house inclosing them, that all points may be reached and supplied.

A special pipe connects the plant with the waterworks of the Ketchikan Light and Power Company, this furnishing all the fresh water required for the use of the employees and the operation of the plant.

In the wing adjoining the freezer building is a 20-ton can ice plant, and there is storage space in the rear of this wing for 70 tons of ice. The plant comprises 155 cans of 400-pounds capacity, each arranged in a single battery and served by a 2-ton electric crane. The ice dump discharges the cakes of ice through openings into an air lock at a level 5 feet above the storage floor, from which it is chuted to all parts of the storeroom and packed.

The engine plant is in a separate building and receives the electric current from the power station at George Inlet in a volume of 6,600 volts. With its transformers it reduces that to 440 and 110 and supplies energy to two 150-horsepower motors which operate two 65-ton compressors to force ammonia through the condensers for making ice.

STATISTICS.

During 1909 there were 281 persons employed in all branches of the halibut industry. The reason for the apparently small number recorded for a fishery of such importance is that many of them spend more time in fishing for king salmon than for halibut, and have been counted in the former fishery, where the greater results were accomplished. The number of steamers and launches increased four over 1908. The total investment is almost exactly the same as in 1908. While the catch in 1909 decreased 472,082 pounds as compared with 1908, the value of the catch increased $20,987.

PERSONS ENGAGED IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1909.

Occupation and race.	Number.	Occupation and race.	Number.
Fishermen:		Shoresmen:	
Vessel fisheries—		Whites	28
Whites	143	Indians	12
Indians	14	Total	40
Total	157	Transporters:	
Shore fisheries—		Whites	10
Whites	40	Grand total	281
Indians	34		
Total	74		

INVESTMENT IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1909.

Items.	Number.	Value.	Items.	Number.	Value.
Fishing vessels:			Boats	46	$8,770
Steamers and launches	28	$56,395	Apparatus:		
Tonnage	210		Vessel fisheries, trawl lines		6,580
Sailing	13	11,762	Shore fisheries, trawl lines		2,275
Tonnage	155		Shore and accessory property		251,850
Transporting vessels:					
Steamers and launches	2	2,400	Total		340,032
Tonnage	11				

PRODUCTS OF THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1909.

Products.	Round weight.	Dressed weight.	Value.
	Pounds.	*Pounds.*	
Vessel catch:			
Halibut, fresh	4,425,223	3,540,659	$162,607
Halibut, frozen	240,604	229,050	14,436
Halibut, fletched	113,997	85,498	4,132
Total	4,779,824	3,855,207	181,175
Shore catch:			
Halibut, fresh	410,100	328,400	14,354
Grand total	5,189,924	4,183,607	195,529

It is probable that the Bureau of Fisheries steamer *Albatross* will this coming summer make an investigation in the open waters adjacent to southeast and central Alaska, in order to determine whether there are any halibut banks of sufficient importance to justify fishing them. What little investigation has been made heretofore has shown that halibut occur in abundance in the ocean off Chichagof and Baranof islands and the mainland between Cape Spencer and Yakutat Bay, in southeast Alaska, and it is possible they are in greater abundance elsewhere in Alaska waters.

PUGET SOUND FISHING FLEET.

A fleet of Puget Sound power and sail vessels visits southeast Alaska during the months from October to March, when, owing to stormy weather and a scarcity of fish, it is not safe nor profitable to visit the fishing banks near the home ports. This fleet makes its headquarters mainly at Petersburg, at the head of Wrangell Narrows, shipping the catch home from Scow Bay, near by, via the regular steamship lines. The opening in September at Ketchikan of the new plant of the New England Fish Company drew some of the vessels to that town. During the year the fleet caught and shipped 2,259,529 pounds of halibut, valued at $78,920. A few of the Puget Sound fleet of steamers also fish at times in Alaska waters, but it has been found impossible to secure accurate data as to their catches taken in this region. None of the above data are included in the statistical tables of this report.

THE HERRING FISHERY.

The run of herring in southeast Alaska was fairly good during a part of the year. Nothing was done in central Alaska in the curing of herring, the plant on Simeonof Island not being operated for reasons stated at length in the 1908 report. According to trustworthy information herring are quite abundant in Port Clarence, and some fishermen located at Grantley Harbor, near the head of this bay, have been salting on a small scale during the past two or three years and selling the fish at Nome and the various settlements in that section of Alaska.

During the summer herring are frequently found around the salmon cannery at Petersburg, and on several occasions the assistant agent caught a number with hook baited with salmon eggs, the fish taking the bait very eagerly. When opened their stomachs were found to be full of salmon eggs.

HERRING FOR BAIT.

In the fall of 1908 one of the floating salmon traps, which had been fitted with a herring spiller composed of 1½-inch mesh, was set in Tongass Narrows for the purpose of catching herring for bait. It met with very poor success, however.

Herring is the bait almost universally employed in the halibut fishery of Alaska, but the supply has not kept pace with the demand. The question of a constant and abundant supply of bait is, in fact, the most serious problem confronting the halibut fishermen. At times the herring will appear in large numbers in the bays and sounds of southeast Alaska, but they are not in much demand until

halibut fishing begins, about September 15. At present most of the herring for food and bait is taken between August 1 and May 1, the fish being the rest of the year in the deep waters or having their stomachs filled with a red feed which burns them out very shortly after death, thus seriously affecting their value and usefulness as either bait or food.

The establishment of several small freezers at places close to the halibut banks, where herring could be frozen and stored until needed in winter, when they are usually very scarce, would probably solve the problem of a constant and abundant supply of bait. Salmon backs could also be frozen and would undoubtedly make excellent bait for halibut. It is probable that the New England Fish Company will devote part of its facilities to the freezing of bait for halibut fishing, while there are several other propositions in this line under consideration at present in other towns in southeast Alaska.

During the past summer the Canadian authorities issued an order in council prohibiting American fishing vessels from buying bait in British Columbia ports. Heretofore the halibut vessels operating in Dixon Entrance and Hecate Straits have been in the habit of purchasing their bait in Nanaimo, British Columbia, while on their way north, but this order compelled them to look elsewhere, and several of them visited southeast Alaska for the purpose. It is highly probable that more of them will do so each season if they can be assured of being able to get the bait when they come.

THE FERTILIZER QUESTION.

The scarcity of bait has again brought to the fore the question whether fertilizer plants should be permitted to utilize herring and other food fishes in their work. The present fisheries law does not prohibit such use of food fishes, and there is now one plant—that of the Alaska Oil and Guano Company, at Killisnóo, in southeast Alaska—engaged in the industry. The company gives employment to a number of the inhabitants of the town of Killisnoo, an Indian settlement, and each year between June and October disburses about $40,000 in wages to these natives and to the white employees. The plant is worth about $35,000. In 1909 it used 52,000 barrels of herring and 3,846 barrels of salmon (dog and humpback) in the preparation of fertilizer and oil. Two steamers, with purse seines, do the fishing. The fishermen complain that the use of these nets in the bays and sounds breaks up the schools, and that the quantity taken has been so large that the schools have suffered seriously in number and size. In justification of its use of herring and certain species of salmon the company has always made the plea that these

fishes were not being used for food and could not be so prepared profitably.

There is insufficient justification in the company's plea now, although it was partially true as regards herring and dog salmon for some years subsequent to 1882, when the plant was first established. Humpback salmon form the major part of the pack at the southeast Alaska canneries, while dog salmon are being used in greater numbers each year. As to herring, the statistics of the fishery shown in this and former reports are ample evidence of the economic uses to which they can be put other than in the preparation of fertilizer and oil.

In view, therefore, of the great need of the herring for food and bait, the time has arrived when the use of food fishes in the preparation of fertilizer should be prohibited. In justice to the company in question, however, at least one full season should be allowed in which to readjust operations and prepare for the change. It is possible that this plant might be profitably operated with the offal from the canneries in its neighborhood, and thus prevent, in part at least, the enormous waste which annually occurs when the offal is thrown overboard and allowed to pollute the waters adjacent to the canneries.

Another reason for saving the herring is that they constitute food for many other fishes. The principal food of the king salmon is herring, and as the catching of king salmon by trolling now forms one of the most important and profitable of the fisheries of southeast Alaska, no condition that adversely affects it should be permitted to exist. There is little question that the serious depletion of the herring schools would correspondingly impair the abundance of king salmon.

MISCELLANEOUS FISHES, CRUSTACEA, SHELLFISH, ETC.

Eulachon (*Thaleichthys pacificus*).—An enormous run of this fish was reported by prospectors to have appeared in the Sushitna River, one of the tributaries of Cook Inlet, the first week in June. It is also abundant in a few other streams in southeast and central Alaska for some two weeks in the spring. Few are used as food by the whites, but the natives consume large quantities.

Sturgeon.—A sturgeon 3 feet 10 inches in length is reported to have been caught in a gill net operated near the mouth of the Stikine River.

A natural history collector of Wrangell reports having seen a sturgeon in the shallow waters of Union Bay in June, 1901. It was about 5 feet in length.

Crabs.—Crabs are exceedingly abundant, particularly in southeast Alaska and in Prince William Sound, in central Alaska, and have

been reported in varying abundance from nearly every section. Recent information is to the effect that edible crabs of a fine variety are caught around King Island, a small island in Bering Strait.

Heretofore the catching and marketing of crabs has been carried on in a desultory fashion at a few places in southeast Alaska and in Prince William Sound, but none were shipped out of the district. This summer one of the Puget Sound dealers, whose sales had been considerably curtailed owing to the inadequacy of the supply from Washington waters and the close season which prevails part of the year, visited Wrangell, Ketchikan, and Juneau, in southeast Alaska, and interested the local dealers and fishermen in the business to the extent that several of them took it up.

The crab pots are of varying sizes and shapes. At Wrangell a rectangular pot of wooden framework is used, about 40 inches long, 18 inches high, and 30 inches wide, with 3½-inch stretch mesh net covering. The tunnels, of which there is one at each end, are 7 inches in width and 5 inches in height. At Ketchikan a circular pot is used, about 3 feet in diameter and 18 inches in height, with two opposite tunnels. The Juneau crab men use a pot similar to the Wrangell variety. These pots cost the fishermen about $1.25 each.

The pots are set on trawls, about 25 or 30 to a trawl. Each is attached to a gangion about 5 fathoms long, thus permitting the raising and emptying of the pot without bringing up the trawl itself. The trawls are marked by buoys and held by anchors. On some of the trawls baited hooks are placed between the gangions for the purpose of catching bait for the pots. All sorts of fish, clams, etc., are used as bait.

Crabs from 6 inches up in size are utilized for shipping. The shippers classify them by weight and size as follows: Medium average, 1½ pounds; large average, 2½ pounds; large, 2½ to 3½ pounds. The fishermen in the Wrangell district received 75 cents per dozen for 6-inch crabs (which average from 1½ to 2 pounds each), and $1.10 per dozen for 6½-inch and larger crabs. The crabs are measured the broad way of the back. The freight to Seattle is $7.50 per measured ton, which would include 35 dozens of crabs. If placed in the cold-storage compartments the rate is $15 per ton. The crabs are packed in wooden boxes holding about 15½ dozens each. At first all were shipped alive, packed in seaweed, but so many died on the way or arrived in bad condition that finally all were boiled before being shipped. These arrived on Puget Sound in excellent condition. A large number were also marketed locally, while a few were shipped to points in the Northwest Territory along the line of the White Pass Railway.

Shrimps.—Shrimps are found in a number of places in southeast Alaska, being fairly abundant at times in Lynn Canal and in the vicinity of Wrangell, while the investigations of the *Albatross* have shown that they are abundant in the waters of central Alaska, south of the Alaska Peninsula. They have been reported from a few places in western Alaska. This summer the assistant fur-seal agent on St. George Island found about a pint of shrimps, *Spirontocaris polaris* (Sabine) in the stomach of a nesting cormorant killed on the island. The condition of the shrimps when taken from the bird's stomach indicated that they had but recently been eaten, thus showing that the crustacean must be abundant in that section of Bering Sea.

Preparations are now under way at Wrangell, in southeast Alaska, for the catching and shipping of shrimps to Puget Sound ports, where they command high prices. Some prospecting has already been done and a few of these crustaceans, known to the fishermen of Puget Sound as "big-spots" (which average 5 inches in length), "coon-stripes" (2 inches in length), and "pinks" (1 to 1½ inches in length), have been gathered. For this purpose a trawl is used which has an oblong mouth 10 feet long by 4 feet wide, the net bag being about 10 feet in length. The mouth framework is made of iron pipe. The trawl is dragged from the stern of the boat and is hauled in by means of a windlass.

Clams.—Clams are abundant throughout Alaska, but in no section are they used to any considerable extent commercially, although the time is probably not far distant when the gathering and marketing of clams will be an important industry. The razor clam, *Machœra patula*, is especially abundant in southeast and central Alaska. The mud clam (probably *Panopea generosa*) has been reported from southeast Alaska. There are said to be large beds of clams and other edible shellfish along the Arctic coast, especially between Cape Prince of Wales and Icy Cape, immense numbers being washed up on the beaches during the prevalence of heavy southerly and southwesterly gales.

Cockles.—Beds of cockles, sometimes called scallops, are known to exist in Funter Bay, on Admiralty Island, and in Dry Strait, near Wrangell, and would probably be found in many other places if systematic search were made. They are eaten, but not sold.

Mussels.—Mussels are plentiful in many sections, especially along the Aleutian chain and in southeast Alaska, where they form an occasional addition to the natives' larder. About twenty years ago some were taken from the neighborhood of Unalaska and planted around St. Paul and St. George islands, of the Pribilof group, where they have thrived and are now found in abundance. The few whites

living on the islands eat them after steaming them in the shell, and report them as delicious.

Oyster.—A native rock oyster has been reported from Sitka, Peril Straits, and the Skookum Chuck on the west side of Prince of Wales Island, in southeast Alaska, and Latouche Island, in Prince William Sound, in central Alaska.

Abalone.—The abalone is found along the ocean side of the islands in southeast Alaska, but no use is made of it.

Octopi.—Octopi are abundant in many sections and are eaten by the natives. A few of the crab fishermen of Wrangell expect next year to engage in the business of catching them with spear and hook and line baited with fish heads, clams, etc. They bring from 6 to 14 cents per pound in the Seattle markets.

Chiton.—A chiton (*Katherina tunicata* Wood), known locally as the "gum boot," is found in southeast Alaska waters (observation would probably disclose that it is a resident of other sections of Alaska), where it is gathered and eaten by the natives.

Sea urchin.—The sea urchin is very abundant along the Aleutian chain, and large numbers are consumed by the natives.

Holothurians.—Bêche-de-mer, trepang, or sea cucumbers, as they are known to the trade, are very abundant in southeast Alaska, but absolutely no use is made of them at present. They are especially abundant in the shallow water in May and June. It is probable that nothing will be done with this product in Alaska until the supply from the South Seas falls off.

Algæ.—In April and May the Thlingits and Yakutats, and possibly other tribes, gather an alga or seaweed (probably *Porphyra laciniata*) which they dry, press in boxes, and put away to be eaten later. In May the Kake tribe gather algæ, and mixing it, when moist, with salt, compress it into cakes a foot square, and from one-fourth to one-half inch in thickness. In this condition it will keep for some time. The prepared product is used in making soups and for other culinary purposes. A small trade in these cakes is carried on with other villages. Certain species of algæ are very nutritious, and it is probable that when their good qualities become better known the whites will seek them as a food product.

THE WHALE FISHERY

The whaling station of the Tyee Company, at Tyee, at the lower end of Admiralty Island, in southeast Alaska, which is the only shore whaling station in the United States where all parts of a whale are utilized, was operated more vigorously than ever this year. In addition to the steamer *Tyee jr.*, which was used in 1908, the gasoline

schooner *Lizzie S. Sorrenson* (49 net tons) was fitted up and used as a whaler, the gasoline schooner *Prosper* being used, as in 1908, for towing the whales to the station. The first whale was killed on May 7. Part of the whaling products from this station shown in the statistical tables are from whales killed in 1908, the products not being shipped until 1909.

There are shore whaling stations along the Arctic shores of Alaska at Point Hope, Cape Lisburne, Icy Cape, and Point Barrow. There are but few white men at these stations, Eskimos composing the most part of the boat crews. Whales are hunted in the open leads in the ocean offshore from the stations. As a rule, only the bone is saved, although the natives use a considerable quantity of the blubber and meat as food. Owing to the difficulty of communicating with these points, no data relating to the persons employed and the investment have been secured. The bone shipped out is shown in the statistical tables.

The latest reports from these stations are that Point Barrow secured 11 whales and Point Hope 13 whales, a decrease of 12 from last year, while at Icy Cape, where 10 or 12 whales were killed in 1908, only 400 pounds of poor bone was secured this year.

Owing to the fact that the big catch of bone by the various fleets in 1908 had glutted the market, the owners of the Arctic fleet are reported to have agreed to hold whalebone at $5 per pound, and not to send their vessels to the Arctic this year, in order to give the whalebone market an opportunity to absorb the surplus supply. Early in the season the owners of one steamer quietly outfitted her and sent her north. Not to be outdone, most of the other owners also outfitted and sent north a few of their vessels. The fleet comprised the steamer *Herman* (290 tons), the steamer *Jeanette* (240 tons), the steamer *Karluk* (221 tons), which will spend the winter of 1909–10 in the North; and the schooner *Rosie H.* (69 tons), which spent the winter of 1908–9 in the North, and was still there when this report closed, although an unconfirmed report had been received to the effect that she was ashore near Flaxman Island. The data relating to this fleet do not appear in the statistical tables of this report, as the headquarters are in San Francisco.

AQUATIC FURS.

Beaver.—But few beavers are now coming from the Yukon Valley, at one time the principal source of supply, the greater part of the present meager quantity coming from the Kuskokwim River. The catch was 2,323 skins, an increase of 1,043 skins over 1908, when 1,280 were taken.

Muskrat.—This animal appears to be increasing in numbers in the Yukon Valley. The natives use many of the skins in barter with other tribes, the greater part being made into clothing, blankets, or robes. Some of the others are made into small articles to be sold to tourists. The outside demand for Alaska muskrat is increasing each year. This year's shipments comprised 121,568 skins, an increase of 89,856 skins over 1908, when only 31,712 were shipped.

Land otter.—There has been a small increase in the catch of land otter, 1,333 having been taken in 1908, while 1,493 were taken in 1909, a gain of 160.

Sea otter.—But one vessel, the schooner *Everett Hays*, owned by Mr. Samuel Applegate, of Unalaska, fitted out for sea-otter hunting in 1909. She hunted from May 16 to August 27 and had very rough weather. Her catch was 17 skins, all of which were secured in portions of six days, covering a period from July 10 to 26.

The Atka natives secured 4 skins near Tanaga Island, in the Aleutian chain. Mr. Charles Rosenberg, who patrols a stretch of some 30 miles of beach on the Bering Sea side of Unimak Island on the lookout for the washing ashore of dead sea otter, secured none this year.

In addition to the catch shown above, 16 skins were secured in various ways and places and shipped out of Alaska, making a total of 37 skins in all, an increase of 5 over 1908.

The British Columbia pelagic sealing fleet, which has been devoting considerable attention of late to sea-otter hunting off the Alaska coast, secured 18 skins this year, and it is very probable that the Japanese pelagic sealing fleet also secured a few skins, although there has been no report received as to the number taken.

Fur seal.—This year 397 fur-seal skins were taken by the Indians in southeast Alaska and sold at a price aggregating $7,383 (price paid the hunters and not the London price). These skins, with the 14,368 shipped from the Pribilof Islands, make a total of 14,765 fur-seal skins shipped from Alaska in 1909.

Outside of the Pribilof Islands, Sitka is the only place on the Pacific coast of the United States from which fur-sealing operations of any consequence are carried on. Under the law, seal hunting is restricted to Indians, white citizens not being permitted to engage in it.

The only time that the herd visits the neighborhood of Sitka is in April and May, when on its way to the Pribilof Islands, in Bering Sea, to breed. About the middle of April the Indian hunters, with their families, leave for the hunting grounds and establish their camps on Tava, Wrangell, and Biorka islands, small islands a few miles from Sitka. This year 18 boat parties had their headquarters on Tava Island, 7 on Wrangell Island, and 9 on Biorka Island. Each

boat party is composed of from 3 to 5 men, and these use sailboats costing about $130 each. Repeating shotguns, costing from $25 to $35 each, are the only weapons used. The hunting is done in the open ocean, and the boats from the various camps cover an area of from 35 to 50 miles directly out from shore and about the same distance up and down the coast. Good weather is essential, and this year the sealers were very fortunate, but few storms occurring during the season.

The hunters on Tava Island secured 215 skins, those on Wrangell Island 84 skins, while those on Biorka Island secured 97 skins, a total of 396 skins. The largest number of skins secured by any one boat was 30, this boat having its headquarters on Biorka Island. One boat operating from the same island secured no skins at all, while another from Wrangell Island killed but one seal. The average per boat was about 11½ skins. The proportion of female skins to the total number killed was reported to be about 1 in 6.

In outfitting these boats, the hunter, who is head man, furnishes the boat and gun, while the rowers furnish the ammunition and food. The gross proceeds arising from the sale of the skins taken are divided equally among the crew, with the exception of the hunter, who gets $3 or $4 more than the others.

Upon the return to Sitka a committee of two is appointed to supervise the sale of the skins. Late in May the buyers from the States appear in Sitka, and as soon as possible thereafter the date of the sale is fixed, usually for some day between June 1 and 5. On this day the skins are all brought to one house, where they are sorted into three sizes—"small," "medium," and "large"—care being taken to keep each boat's catch separate from the others. The "small" skins are those of the pups born during the previous two years. The "medium" skins are said to have the best fur, but the buyers prefer the "large" ones on account of their size. Large skins were a little more numerous this year than the medium skins. The buyers are not allowed to pick out the choice skins and bid on these alone, but must take them as they run, the subdivision in the beginning being made merely in order that the buyers might see what they were bidding on.

Only two nonresident buyers were present at the sale this year. The best price offered was $20 per skin, but the Indians refused to sell for less than $25 per skin, the price received in 1908, and as a result the sale was declared off. Later on the skins were disposed of at private sale to local buyers, who paid $17 each for all but a few which brought $20 each.

These skins are usually much sought after by the dealers, because, being taken by natives, and a certificate from the collector of customs to this effect being attached to each, they can, under the law, be

sent abroad to be cleaned and dyed and brought back to be sold in our markets. The possession of such a certificate is considered to add about $10 to the value of the skin.

The pelagic fleet hailing from British Columbia and working on the northern herd was composed of 5 vessels, and its catch is reported to have been 3,555 skins. The Japanese fleet working on the Alaska herd consisted of 23 vessels and is reported to have secured about 10,000 skins. The Indian canoe catch along the British Columbia coast while the herd was migrating northward amounted to 187 skins.

A Canadian pelagic sealing schooner, alleged to have been the *Pescawha*, of Victoria, visited Chirikof Island, a small island southwest of Kodiak Island, on June 12, and two boat loads of armed men landed and killed 5 cattle, taking the carcasses aboard the schooner. Protests from a native who was in charge of the cattle for the owner, and even went aboard the vessel to remonstrate with the master regarding the raid, were disregarded.

This outrage recalls an occurrence in 1907, when the native village of Uguiak, a few miles inside the mouth of Alitak Bay, at the south end of Kadiak Island, was raided by the crew of a Japanese sealing schooner. Throughout central Alaska there are a number of such small native villages, which are practically deserted during the summer months, when the inhabitants are working for the salmon canneries and salteries, in some instances 40 or 50 miles away. The safety of these villages is a matter of vital interest not only to the natives but to cannery and saltery proprietors as well, who draw upon them for labor. At the present time, however, there is practically no coast patrol or other protection in this region of central Alaska.

Upon the sworn complaint of several Sitka Indian sealers that Japanese sealing vessels were killing seals within the 3-mile limit, and also landing on certain islands near by, the deputy marshal at Sitka, accompanied by a detail of marines from the post at that place, went out in launches on May 3 and captured the schooner *Kaise Maru*, of 68.44 tons gross burden and hailing from the port of Ishihama, Japan, which was alleged to have been anchored at the place captured since April 28. The schooner, which was fully equipped for sealing, and had 10 skins aboard, was brought to Sitka, and shortly thereafter her crew of 30 people were transferred to the jail at Juneau, where they were confined until the time of their trial in September. All were acquitted through the inability of the Indian witnesses to fix accurately the distance from shore at which the schooner was working.

Early in May the collector of customs ordered a Japanese sealing schooner, which had been anchored for several days in Yakutat Bay for no apparent reason, to put to sea.

RECOMMENDATIONS.

1. That vessels be provided for use of the salmon inspection service, as recommended in the 1908 report and elsewhere in these pages.

2. That the provisions of chapter 425 of the act of Congress passed March 3, 1899, relating to pollution of the navigable waters of the United States and their tributaries, be extended to protect the Alaskan fisheries, and that the agents of the Department of Commerce and Labor be empowered to enforce them.

3. That no more industrial plants for the packing, preserving, or freezing of salmon in Alaska be allowed to be established except by authorization of the Secretary of Commerce and Labor.

4. That the use of food fishes in the manufacture of fertilizer and oil be forbidden by law, effective after reasonable notice to owners of existing plants.

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LAWS AND REGULATIONS RELATIVE TO FUR-SEAL FISHING

Bureau of Fisheries Document No. 732

68427°—11——19

LAWS AND REGULATIONS RELATIVE TO FUR-SEAL FISHING.

The following act of Congress, approved December 29, 1897, and the annexed regulations of the Paris Tribunal of Arbitration, concluded at Washington, February 29, 1892, in relation to the fur seals, are published for the information of all concerned:

ACT OF CONGRESS APPROVED DECEMBER 29, 1897.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no citizen of the United States, nor person owing duty of obedience to the laws or the treaties of the United States, nor any person belonging to or on board of a vessel of the United States, shall kill, capture, or hunt, at any time or in any manner whatever, any fur seal in the waters of the Pacific Ocean north of the thirty-fifth degree of north latitude and including Bering Sea and the Sea of Okhotsk.

SECTION 2. That no citizen of the United States, nor person above described in section one, shall equip, use, or employ, or furnish aid in equipping, using or employing, or furnish supplies to any vessel used or employed, or to be used or employed in carrying on or taking part in said killing, capturing, or hunting of fur seals in said waters, nor shall any vessel of the United States be so used or employed.

SEC. 3. That every person guilty of a violation of the provisions of this Act, or of any regulations made thereunder, shall, for each offense, be fined not less than two hundred dollars or more than two thousand dollars, or imprisoned not more than six months, or both; and every vessel, its tackle, apparel, furniture, and cargo, at any time used or employed in violation of this Act, or of the regulations made thereunder, shall be forfeited to the United States.

SEC. 4. That if any vessel of the United States shall be found within the waters to which this Act applies, having on board fur-seal skins, or bodies of seals, or apparatus or implements suitable for killing or taking seals, it shall be presumed that such vessel was used or employed in the killing of said seals, or that said apparatus or implements were used in violation of this Act until the contrary is proved to the satisfaction of the court.

SEC. 5. That any violation of this Act or of the regulations thereunder may be prosecuted either in the district court of Alaska or in any district court of the United States in California, Oregon, or Washington.

SEC. 6. That this Act shall not interfere with the privileges accorded to Indians dwelling on the coast of the United States under section six

of the act of April sixth, eighteen hundred and ninety-four, but the limitations prescribed in said Act shall remain in full force.

SEC. 7. That this Act shall not affect in any way the killing or taking of fur seals upon the Pribilof Islands, or the laws of the United States relating thereto.

SEC. 8. That any officer of the Naval or Revenue Cutter Service of the United States, and any other officers duly designated by the President, may search any vessel of the United States in port or on the high seas suspected of having violated or of having an intention to violate the provisions of this Act, and may seize such vessel and the offending officers and crew and bring them into the most accessible port of the States and Territory mentioned in section five of this Act for trial.

SEC. 9. That the importation into the United States by any person whatsoever of fur-seal skins taken in the waters mentioned in this Act, whether raw, dressed, dyed, or manufactured, is hereby prohibited, and all such articles imported after this Act shall take effect shall not be permitted to be exported, but shall be seized and destroyed by the proper officers of the United States.

SEC. 10. That the President shall have power to make all necessary regulations to carry this Act into effect.

Approved, December 29, 1897.

Under the provisions of the foregoing act of Congress it is unlawful for any citizen of the United States or any vessel thereof to engage in pelagic sealing *at any time or in any manner*, in the waters of the Pacific Ocean north of the thirty-fifth degree of north latitude, in the Bering Sea, and the Sea of Okhotsk, and it shall be the duty of vessels of the Revenue Cutter Service of the United States to seize any United States vessel found violating this law, *whether during the open or closed season* prescribed in the regulations of the Paris Arbitration Tribunal, and to send or bring such vessel, her officers and crew into the most accessible port of the United States for trial.

REGULATIONS OF THE PARIS TRIBUNAL OF ARBITRATION.

Whereas the following articles of the award of the Tribunal of Arbitration constituted under the treaty concluded at Washington the twenty-ninth of February, eighteen hundred and ninety-two, between the United States of America and Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, were delivered to the agents of the respective Governments on the fifteenth day of August, eighteen hundred and ninety-three:

ARTICLE 1.

The Governments of the United States and Great Britain shall forbid their citizens and subjects, respectively, to kill, capture, or pursue at any time, and in any manner whatever, the animals commonly called fur seals, within a zone of sixty miles around the Pribilof Islands, inclusive of the territorial waters.

The miles mentioned in the preceding paragraph are geographical miles, of sixty to a degree of latitude.

ARTICLE 2.

The two Governments shall forbid their citizens and subjects respectively, to kill, capture, or pursue, in any manner whatever, during the season extending, each year, from the first of May to the thirty-first of July, both inclusive, the fur seals on the high sea, in the part of the Pacific Ocean, inclusive of the Bering Sea, which is situated to the north of the thirty-fifth degree of north latitude, and eastward of the one hundred and eightieth degree of longitude from Greenwich till it strikes the water boundary described in article one of the treaty of eighteen hundred and sixty-seven between the United States and Russia, and following that line up to Bering Straits.

ARTICLE 3.

During the period of time and in the waters in which the fur-seal fishing is allowed, only sailing vessels shall be permitted to carry on or take part in fur-seal fishing operations. They will, however, be at liberty to avail themselves of the use of such canoes or undecked boats, propelled by paddles, oars, or sails, as are in common use as fishing boats.

ARTICLE 4.

Each sailing vessel authorized to fish for fur seals must be provided with a special license issued for that purpose by its Government, and shall be required to carry a distinguishing flag to be prescribed by its Government.

ARTICLE 5.

The masters of the vessels engaged in fur-seal fishing shall enter accurately in their official log book the date and place of each fur-seal fishing operation, and also the number and sex of the seals captured upon each day. These entries shall be communicated by each of the two Governments to the other at the end of the fishing season.

ARTICLE 6.

The use of nets, firearms, and explosives shall be forbidden in the fur-seal fishing. This restriction shall not apply to shotguns when such fishing takes place outside of Bering Sea during the season when it may be lawfully carried on.

ARTICLE 7.

The two Governments shall take measures to control the fitness of the men authorized to engage in fur-seal fishing; these men shall have been proved fit to handle with sufficient skill the weapons by means of which this fishing may be carried on.

ARTICLE 8.

The regulations contained in the preceding articles shall not apply to Indians dwelling on the coast of the territory of the United States or of Great Britain, and carrying on fur-seal fishing in canoes or undecked boats not transported by or used in connection with other

vessels and propelled wholly by paddles, oars, or sails, and manned by not more than five persons each in the way hitherto practiced by the Indians, provided such Indians are not in the employment of other persons and provided that, when so hunting in canoes or undecked boats, they shall not hunt fur seals outside of territorial waters under contract for the delivery of the skins to any person.

This exemption shall not be construed to affect the municipal law of either country, nor shall it extend to the waters of Bering Sea or the waters of the Aleutian Passes.

Nothing herein contained is intended to interfere with the employment of Indians as hunters or otherwise in connection with fur-sealing vessels as heretofore.

ARTICLE 9.

The concurrent regulations hereby determined with a view to the protection and preservation of the fur seals, shall remain in force until they have been, in whole or in part, abolished or modified by common agreement between the Governments of the United States and of Great Britain.

The said concurrent regulations shall be submitted every five years to a new examination, so as to enable both interested Governments to consider whether, in the light of past experience, there is occasion for any modification thereof.

The above regulations of the Paris Tribunal of Arbitration are still in force as applicable to *British vessels*. The closed season for pelagic sealing is therein fixed from the first of May to the thirty-first of July, both inclusive, during which period it is unlawful for British vessels to kill, capture, or pursue the fur seals on the high seas in the Pacific Ocean north of the thirty-fifth degree of north latitude, or eastward of the one hundred and eightieth degree of longitude. Under said regulations British vessels are permitted to engage in pelagic sealing after the thirty-first of July, but in the performance of said sealing they are forbidden to enter within a zone of sixty miles around the Pribilof Islands. It shall be the duty of vessels of the Revenue Cutter Service detailed to patrol the waters above described to seize any British vessel found violating the said regulations of the Paris Arbitration Tribunal, and send or bring the vessel so offending, with all persons on board, together with the proofs and declarations of the officer making the seizure, to Unalaska and deliver her to the senior British naval officer present, or to the most convenient port in British Columbia and there deliver her to the proper authorities of Great Britain or to the commanding officer of any British vessel charged with the enforcement of said regulations.

In addition to the foregoing laws for the protection of fur seals, the President has issued executive orders creating government reservations as follows in the vicinity of the islands of St. Paul and St. George, Alaska, and forbidding the disturbance of all animal life found thereon, under penalties described in the act of Congress approved May 11, 1908:

Walrus and Otter islands, of the Pribilof Group, in Bering Sea, located approximately in latitude 57° north, longitude 170° west from Greenwich; known as the "Pribilof Reservation."

St. Matthew Island, Hall Island, and Pinnacle Islet, in Bering Sea, located approximately in latitude 60°, 30′ north, longitude 172° 30′ west from Greenwich; known as "Bering Sea Reservation."

Bogoslof Islands, Alaska, in Bering Sea, located approximately in latitude 53 degrees 58 minutes north, longitude 167 degrees 53 minutes west from Greenwich, known as the "Bogoslof Reservation."

The act approved June 14, 1906, prohibits aliens from fishing in the waters of Alaska within the jurisdiction of the United States.

CHARLES NAGEL,
Secretary of Commerce and Labor.

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THE FUR-SEAL FISHERIES OF ALASKA IN 1909

By WALTER I. LEMBKEY
Agent in Charge

Bureau of Fisheries Document No. 735

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INTRODUCTION.

After the purchase of Alaska by the United States in 1867, the Pribilof Islands, which were a part of the purchase and of immense value as one of the breeding grounds of the northern fur seal, were set aside as a government reservation and placed under the administration of the Treasury Department. In 1870, under authority from Congress, the Secretary of the Treasury leased for twenty years to the highest bidder, which was the Alaska Commercial Company, the sole right to take sealskins on these islands. During this period the income to the Government was $6,010,565, representing 1,840,364 sealskins taken by the lessee. In 1890 the contract with the Alaska Commercial Company having expired, the sealing privilege was again leased for twenty years, the highest bidder in this case being the North American Commercial Company. The number of skins taken during this period was 339,180, for which the Government has received $3,752,415. In 1903, with the creation of the Department of Commerce and Labor, the administration of the seal islands was transferred from the Secretary of the Treasury to the Secretary of Commerce and Labor, who, on December 28, 1908, placed their general management under the direct control of the Commissioner of Fisheries.

Under the terms of the contract, which expired May 1, 1910, the lessee paid $10.22½ for each sealskin taken, the Government determining the number and classes of seals that should be killed each year and supervising the killing through its agents stationed on the islands. The company employed the natives to kill the seals, paying them a stated amount per skin, and in addition furnished them, annually, dried salmon, salt and barrels for preservation of the meat supply, 80 tons of coal, comfortable dwellings, schoolhouses, teachers, physicians, and medicines; it furnished also all the necessaries of life to the widows, orphans, and aged and infirm inhabitants. To supplement the natives' earnings, the United States Government appropriated $19,500 each year for their fuel, clothing, and food.

The lessee purchased also, under yearly contract, skins of the arctic foxes, which are found chiefly on the island of St. George. The trapping of these animals and the selection for killing are under direct charge of the government agents. The entire revenue from the foxes ($5 for each blue pelt and $1 for each white) is applied to the support of the natives.

THE FUR-SEAL FISHERIES OF ALASKA IN 1909.

By Walter I. Lembkey,
Agent in Charge.

STATISTICS OF SEALS KILLED.

ST. PAUL ISLAND.

During the lessee's sealing season of 1909, which began June 28 and ended July 31 following, a total of 9,508 sealskins was secured on St. Paul Island. For this there were 35 drives, one of which was made for the additional purpose of securing bachelors for the breeding reservation. For the whole season, the general average of skins obtained in each drive was 271.

During the fall of 1908 and spring of 1909, 7 drives were made on St. Paul Island by the agents to furnish food for the natives. From these, 1,506 skins were secured. This number, together with 32 which had been retained from the previous season and were ordered to be delivered to the lessee by the letter of the Commissioner of Fisheries dated March 11, 1909, and with 7 skins taken from seals killed by the watchmen at Zapadni for food, made a total of 11,053 skins on hand on St. Paul Island on July 31, 1909.

Statement of Fur Seals Killed on St. Paul Island, Alaska, during the Year ended July 31, 1909.

Date.	Rookery.	Seals killed for natives' food.			Seals killed by lessees for skins.						Aggregate.		
		Large young seals.	Skins accepted by lessees.	Skins rejected, cut.	Accepted, prime.	Rejected.				Total.	Skins accepted.	Skins rejected.	Total number of seals killed.
						Under size.	Cut.	Too large.	Bitten.				
1908.													
Aug. 1	*Too large and too small retained from previous season (delivery as part of quota of 1908 authorized by letter of Commissioner of Fisheries, March 11, 1909).*	.....	.....	.....	.....	*30*	....	*2*	....	*32*	.....	*32*	*32*
8	Gorbatch	183	181	2	.....	....	....	....	....	.....	181	2	183
Oct. 20	Reef and Ketovi	107	105	2	.....	....	....	....	....	.....	105	2	107
29	Tolstoi and Middle Hill	158	158	....	.....	....	....	....	....	.....	158	....	158
Nov. 3	Northeast Point	718	716	2	.....	....	....	....	....	.....	716	2	718
18	Reef	169	169	....	.....	....	....	....	....	.....	169	....	169

STATEMENT OF FUR SEALS KILLED ON ST. PAUL ISLAND, ALASKA, DURING THE YEAR ENDED JULY 31, 1909—Continued.

Date.	Rookery.	Seals killed for natives' food.			Seals killed by lessees for skins.						Aggregate.		
		Large young seals.	Skins accepted by lessees.	Skins rejected, cut.	Accepted, prime.	Rejected.					Skins accepted.	Skins rejected.	Total number of seals killed.
						Under size.	Cut.	Too large.	Bitten.	Total.			
1909.													
May 29	Sea Lion Rock	93	93	....	.....	....	....	....	....	.....	93	....	93
June 7	.....do	78	77	1	.....	....	....	....	....	.....	77	1	78
28	Tolstoi	.....	.....	....	100	....	....	1	....	101	100	1	101
29	Reef	.....	.....	....	175	1	2	....	1	179	175	4	179
July 2	Northeast Point	.....	.....	....	454	1	....	....	....	455	454	1	455
5	Zapadni	.....	.....	....	200	....	....	....	....	200	200	....	200
6	Reef and Gorbatch	.....	.....	....	502	....	3	....	....	505	502	3	505
6	Tolstoi	.....	.....	....	175	....	4	....	2	181	175	6	181
7	Halfway Point	.....	.....	....	76	....	1	....	....	77	76	1	77
8	Northeast Point	.....	.....	....	613	....	4	....	....	617	613	4	617
10	Zapadni	.....	.....	....	273	....	2	....	4	279	273	6	279
11	Reef and Gorbatch	.....	.....	....	288	1	....	....	....	289	288	1	289
11	Tolstoi	.....	.....	....	127	....	1	....	1	129	127	2	129
13	Halfway Point	.....	.....	....	33	....	1	....	....	34	33	1	34
14	Northeast Point	.....	.....	....	207	....	....	....	....	207	207	....	207
15	Reef and Gorbatch	.....	.....	....	250	....	1	....	....	251	250	1	251
15	Tolstoi and Lukanin[a]	.....	.....	....	113	....	....	....	1	114	113	1	114
16	Zapadni	.....	.....	....	275	....	1	....	....	276	275	1	276
19	Northeast Point	.....	.....	....	717	....	1	....	....	718	717	1	718
19	Halfway Point	.....	.....	....	34	....	....	....	....	34	34	....	34
20	Reef and Gorbatch	.....	.....	....	581	....	5	....	2	588	581	7	588
20	Tolstoi	.....	.....	....	43	....	....	....	....	43	43	....	43
21	Zapadni	.....	.....	....	326	....	1	....	4	331	326	5	331
23	Northeast Point	.....	.....	....	472	....	2	....	1	475	472	3	475
23	Halfway Point	.....	.....	....	32	....	....	....	....	32	32	....	32
24	Reef and Gorbatch	.....	.....	....	680	....	4	....	1	685	680	5	685
25	Zapadni	.....	.....	....	242	....	2	....	1	245	242	3	245
27	Northeast Point	.....	.....	....	185	....	1	....	1	187	185	2	187
27	Halfway Point	.....	.....	....	16	....	....	....	....	16	16	....	16
28	Reef and Gorbatch	.....	.....	....	452	....	1	....	....	453	452	1	453
30	Zapadni	.....	.....	....	579	....	6	....	....	585	579	6	585
31	Reef and Gorbatch	.....	.....	....	654	....	4	....	2	660	654	6	660
31	Ketovi and Lukanin	.....	.....	....	110	....	....	....	....	110	110	....	110
31	Northeast Point	.....	.....	....	329	....	1	....	....	330	329	1	330
31	Halfway Point	.....	.....	....	19	....	....	....	....	19	19	....	19
31	Zapadni	.....	.....	....	40	....	1	....	....	41	40	1	41
31	Gorbatch	.....	.....	....	60	....	2	....	....	62	60	2	62
	Watchmen's skins from Zapadni	7	7	....	.....	....	....	....	....	.....	7	....	7
	Total	1,513	1,506	7	9,432	33	51	3	21	9,540	10,938	115	11,053

[a] Fifty-one of these skins were from Lukanin.

ST. GEORGE ISLAND.

On St. George Island during the lessee's killing season of 1909, which covered the period from June 19 to July 31 of that year, 2,792 seals were killed. This number represents 14 drives, with an average of 199 skins obtained in each drive.

During the fall of 1908 and spring of 1909 (the so-called "food-killing" season), 521 seals were killed for natives' food by watchmen and in drives made by the government agents, and these skins also were delivered to the lessee. There were delivered to the lessee, under the authority previously quoted, 5 sealskins retained by the

government agents from the preceding season because they exceeded the weight allowed by the regulations.

There were on hand, therefore, on St. George Island on July 31, 1909, 3,318 sealskins, gathered from the sources enumerated.

STATEMENT OF FUR SEALS KILLED ON ST. GEORGE ISLAND, ALASKA, DURING THE YEAR ENDED JULY 31, 1909.

Date.	Rookery.	Seals killed for natives' food.		Seals killed by lessees for skins, accepted, prime.	Aggregate.	
		Large young seals.	Skins accepted by lessees.		Skins accepted.	Total number of seals killed.
	Overweight skins retained from previous season (delivery as part of quota of 1908 authorized by letter of Commissioner of Fisheries, dated March 11, 1909)			5	5	5
1908.						
Aug. 7	North (food drive)	67	67		67	67
7	Zapadni (watchman)	5	5		5	5
Oct. 19	Staraya Artel	23	23		23	23
21	North	32	32		32	32
23	East	22	22		22	22
24	Zapadni (watchman)	6	6		6	6
30	Staraya Artel	35	35		35	35
31	Zapadni (watchman)	6	6		6	6
Nov. 2	East	18	18		18	18
3	North	91	91		91	91
7	Zapadni (watchman)	6	6		6	6
13	North and Staraya Artel	94	94		94	94
17	.....do	17	17		17	17
23	Staraya Artel	20	20		20	20
1909.						
June 5	Zapadni (watchman)	2	2		2	2
5	Staraya Artel	26	26		26	26
12	Zapadni (watchman)	2	2		2	2
15	North	26	26		26	26
19	Zapadni (watchman)	2	2		2	2
22	North (food drive)	18	18		18	18
24	East (watchman)	1	1		1	1
26	Zapadni (watchman)	2	2		2	2
29	Zapadni			32	32	32
July 2	East, North, and Staraya Artel			312	312	312
6	.....do			350	350	350
8	Zapadni			42	42	42
10	East, North, and Staraya Artel			201	201	201
14	.....do			242	242	242
16	Zapadni			31	31	31
19	East, North, and Staraya Artel			446	446	446
21	Zapadni			42	42	42
23	East, North, and Staraya Artel			404	404	404
27	.....do			260	260	260
31	.....do			368	368	368
31	Zapadni			62	62	62
	Total[a]	521	521	2,797	3,318	3,318

[a] Four skins of this year's catch exceeding the limit of 8½ pounds in weight are retained in salt, subject to future disposition. The number available for shipment the current year is therefore 3,314.

TOTAL SEALSKINS SHIPPED.

From St. Paul Island, on August 14, 1909, on the steamer *Homer*, there were shipped 11,054[a] sealskins, 32 of which were chargeable to the quota of 1908 and 11,022 to that of 1909. From St. George Island there were shipped on the same vessel 3,314 sealskins, all chargeable to the quota of 1909, with the exception of 5 skins credited to 1908 under the authority already quoted.

The total shipment of skins in 1909 from both islands, as detailed in the foregoing, was 14,368, of which 14,331 are credited to the quota of 1909, and 37 to the quota of the previous year, 1908.

OBSERVANCE OF REGULATIONS.

On St. Paul Island the lessee took only 1 skin which failed to weigh at least 5 pounds, and none were taken weighing over 8½ pounds, the limits prescribed by the Department. It is doubtful, furthermore, whether the 1 skin was not the result of an accident in clubbing or was not taken from a seal that had died from overheating during a drive. As the good faith of the lessee was undeniably demonstrated in every particular this 1 skin was permitted to be included in the shipment.

On St. George Island 4 skins exceeding 8½ pounds in weight were taken, and these are now retained in salt on that island awaiting instructions.

WEIGHTS OF SKINS.

In addition to being weighed on the islands the lessee's take of skins in 1909, when shipped to London, was classified by the factor, and the weights of the various classes ascertained there. As weighed on the islands there is a variation among the skins in respect to their degree of moisture. The scales, moreover, register only to the quarter pound; and the recording of the weights in the midst of the noise in the salt house incident to salting and weighing at the same time, with the subsequent necessary transcription and classification from notebooks, are further factors operating against perfect accuracy in the weights. Deficiencies in the following table are explained by these conditions. As weighed in London, on the other hand, the skins contain some of the salt that was used to cure them. Notwithstanding the impracticability of close comparison, however, it will be interesting to observe how the island weights in general correspond to the London weights taken by a disinterested person.

[a] To the season's catch of 11,053 on St. Paul Island, one skin from a subsequent food drive was added to make an even number, as required for shipment.

Island Weights of Skins, 1909 Catch.

Weight.	Number of skins.			Weight.	Number of skins.		
	St. Paul Island.	St. George Island.	Total.		St. Paul Island.	St. George Island.	Total.
Pounds.				*Pounds.*			
4	.....	1	1	7¼	595	15	610
4½	1	.....	1	7½	779	95	874
4½	2	12	14	7¾	359	4	363
4¾	13	1	14	8	424	57	481
5	493	380	873	8¼	195	1	196
5¼	438	39	477	8½	389	11	400
5½	903	507	1,410	8¾	9	.....	9
5¾	859	26	885	9	7	3	10
6	1,373	1,017	2,390	9¼	.....	1	1
6¼	946	38	984	9½	.....	1	1
6½	1,376	481	1,857	10	1	1	2
6¾	774	33	807	10½	1	1	2
7	1,045	598	1,643	14½	1	.....	1

Note.—On St. Paul Island no skins weighing more than 8½ pounds and only 1 weighing less than 5 pounds were taken during the lessee's killing season. On St. George Island 4 skins weighing more than 8½ pounds were taken during the lessee's killing season, and are held by the government agents on the island pending orders for disposition. With these exceptions, under and over weight skins appearing in the table were taken in drives for the native's food or are hold-overs from the previous season.

London Weights of Skins, 1909 Catch.

[London, November 10, 1909. Subject to recount. North American Commercial Company, 1909 catch, 14,368.]

Number of skins.	Weight.	Per cent.	Classification.
	Lbs. oz.		
1	13 0	.....	Middling.
23	9 0	0.16	Middlings and smalls.
290	8 3	2.04	Smalls.
1,224	7 1	8.61	Large pups.
4,097	6 8	28.83	Middling pups.
5,248	5 13	36.93	Small pups.
1,096	5 6	7.71	Ex. small pups.
11	5 1	.08	Ex. ex. small pups.
		84.36	
3	9 0		Middlings and smalls, low.
65	7 5		Smalls, low.
189	6 7	6.62	Large pups, low.
401	5 14		Middling pups, low.
253	5 7		Small pups, low.
30	5 0		Ex. small pups, low.
1	10 0		Middlings and smalls, cut.
28	7 10		Smalls, cut.
93	6 8	4.78	Large pups, cut.
244	5 13		Middling pups, cut.
251	5 6		Small pups, cut.
64	5 0		Ex. small pups, cut.
9	7 10		Smalls, rubbed.
50	7 0		Large pups, rubbed.
186	6 6	3.97	Middling pups, rubbed.
254	5 12		Small pups, rubbed.
65	5 7		Ex. small pups, rubbed.
38	.....	.27	Faulty.
14,214			
5	.....	.....	Smalls.
15	.....	.....	Large pups.
47	.....	.....	Middling pups.
58	.....	.....	Small pups.
11	.....	.....	Ex. small pups.
136			

Note.—The statement furnished from London omits some weights, but, as will be observed, 136 of these are included in the classification.

REJECTIONS FROM DRIVES.

On St. Paul 13,656 animals appeared in the drives during the lessee's sealing season, of which 9,508, or 69 per cent, were killed. There were released from the killing fields 1,110 small and 1,185 large seals, in addition to 1,915 marked or branded seals, composed of 1,315 2-year-olds and 600 3-year-olds. The individual killings varied in the percentages of seals killed from 81 to 39 per cent.

On St. George, during the same season, 4,484 animals appeared in the drives, of which 2,863, or 63 per cent, were killed. There were released 555 large and 306 small seals, in addition to the dismissal of 760 marked seals the ages of which were not segregated.

In 1909, killing on St. Paul was 4 per cent closer, and on St. George 17 per cent closer, than it was in 1908.

STATEMENT OF SEALS KILLED AND SEALS DISMISSED FROM DRIVES DURING LESSEE'S SEALING SEASON ON ST. PAUL ISLAND, 1909.

Date.	Rookery.	Killed.	Dismissed.				Total driven.	Per cent killed.
			Small.	Large.	Branded			
					Two years.	Three years.		
1909.								
June 28	Tolstoi	101	10	73	.....	.....	184	54
29	Reef	179	2	117	92	58	448	39
July 2	Northeast Point	455	70	71	159	40	795	57
5	Zapadni	200	9	33	33	11	286	69
6	Reef and Gorbatch	505	16	81	36	11	649	77
6	Tolstoi	181	43	31	5	8	268	67
7	Halfway Point	77	8	35	2	1	123	62
8	Northeast Point	617	89	47	43	10	806	75
10	Zapadni	279	49	23	14	3	368	76
11	Reef and Gorbatch	289	25	12	17	10	353	81
11	Tolstoi	129	23	4	7	.....	163	79
13	Halfway Point	34	4	20	3	1	62	54
14	Northeast Point	207	64	14	22	7	314	65
15	Reef and Gorbatch	251	74	8	39	14	386	65
15	Tolstoi and Lukanin	114	12	5	12	9	152	75
16	Zapadni	276	85	14	40	37	452	61
19	Northeast Point	718	190	27	100	31	1,066	67
19	Halfway Point	34	1	8	6	.....	49	69
20	Reef and Gorbatch	588	80	35	96	27	826	71
20	Tolstoi	43	4	1	7	.....	55	78
21	Zapadni	331	38	21	41	21	452	73
23	Northeast Point	475	53	48	90	46	712	66
23	Halfway Point	32	.....	15	5	4	56	57
24	Reef and Gorbatch	685	40	81	94	41	941	72
25	Zapadni	245	22	11	27	5	310	79
27	Northeast Point	187	3	58	71	36	355	52
27	Halfway Point	16	.....	17	5	.....	38	42
28	Reef and Gorbatch	453	18	26	56	31	584	77
30	Zapadni	585	39	38	46	29	737	79
31	Reef and Gorbatch	660	21	81	70	31	863	76
31	Northeast Point	330	15	75	42	58	520	63
31	Halfway Point	19	.....	7	3	4	33	57
31	Zapadni	41	3	14	14	8	80	51
31	Gorbatch	62	.....	.....	.....	.....	.....	.....
31	Ketovi and Lukanin	110	.....	34	18	8	170	64
	Total	9,508	1,110	1,185	1,315	600	13,656	69

Classification of Large Seals Dismissed during Lessee's Sealing Season on St. Paul Island, 1909.

Date.	Rookery.	Four years.	Five years.	Six years.	Seven years.	Adult.	Cows.
1909.							
June 28	Tolstoi	8	22	22	21	.....	.....
29	Reef	20	41	39	17	.....	.....
July 2	Northeast Point	16	21	22	12	.....	.....
5	Zapadni	1	7	12	13	.....	.....
6	Reef and Gorbatch	25	16	25	15	.....	.....
6	Tolstoi	3	6	19	3	.....	.....
7	Halfway Point	5	14	12	4	.....	.....
8	Northeast Point	14	11	13	9	.....	.....
10	Zapadni	2	8	10	3	.....	.....
11	Reef and Gorbatch	3	3	5	1	.....	.....
11	Tolstoi	2	2	.....	.....	.....	.....
13	Halfway Point	5	7	7	1	.....	.....
14	Northeast Point	8	3	3	.....	.....	.....
15	Reef and Gorbatch	3	3	2	.....	.....	.....
15	Tolstoi and Lukanin	.....	2	3	.....	.....	.....
16	Zapadni	1	.....	10	3	.....	.....
19	Northeast Point	12	9	2	4	.....	.....
19	Halfway Point	.....	.....	4	4	.....	.....
20	Reef and Gorbatch	5	6	6	18	.....	.....
20	Tolstoi	.....	.....	.....	1	.....	.....
21	Zapadni	3	8	8	2	.....	.....
23	Northeast Point	12	15	11	10	.....	.....
23	Halfway Point	1	6	5	3	.....	.....
24	Reef and Gorbatch	16	16	32	13	4	.....
25	Zapadni	8	3	.....	.....	.....	1
27	Northeast Point	6	9	29	4	10	.....
27	Halfway Point	.....	3	7	7	.....	.....
28	Reef and Gorbatch	2	4	7	3	10	14
30	Zapadni	7	16	7	8	.....	10
31	Reef and Gorbatch	9	18	23	23	8	4
31	Ketovi and Lukanin	3	14	6	10	1	.....
31	Halfway Point	.....	4	2	1	.....	.....
31	Northeast Point	13	27	22	5	8	18
31	Zapadni	1	6	2	5	.....	3
	Total	214	330	377	223	41	50

Statement of Seals Killed and Seals Dismissed from Drives during Lessee's Sealing Season on St. George Island, 1909.

Date.	Rookery.	Killed.	Dismissed.			Total driven.	Percentage killed.
			Large.	Small.	Branded.		
1909.							
June 5	Staraya Artel	26	35	.....	.....	61	42.6
15	North and Staraya Artel	26	50	.....	.....	76	34.0
22	.....do	18	74	.....	.....	92	19.5
24	East	1	70	.....	.....	71	1.4
29	Zapadni	32	38	.....	.....	70	45.7
July 2	East, North, and Staraya Artel	312	36	28	67	443	70.4
6	.....do	350	27	66	55	498	70.2
8	Zapadni	42	13	2	4	61	68.8
10	East, North, and Staraya Artel	201	21	28	37	287	70.0
14	.....do	242	7	41	70	360	67.2
16	Zapadni	31	1	4	12	48	64.5
19	East, North, and Staraya Artel	446	15	39	146	646	69.0
21	Zapadni	42	21	.....	.....	63	66.6
23	East, North, and Staraya Artel	404	49	33	111	597	67.6
27	.....do	260	20	45	114	439	59.2
31	.....do	368	57	20	137	582	63.2
31	Zapadni	62	21	.....	7	90	68.8
	Total[a]	.....	.....	306	760	.....	63.0

[a] This total includes 71 seals taken during the lessee's season by the natives for food, leaving the total killed by the lessee 2,792, or 62.3 per cent of the total driven.

CLASSIFICATION OF SEALS DISMISSED FROM DRIVES DURING LESSEE'S SEALING SEASON ON ST. GEORGE ISLAND, 1909.

Date.	Rookeries.	Large.				Cows.
		Four years.	Five years.	Six years.	Young bulls	
1909.						
June 5	Staraya Artel	20	5	2	8	
15	North and Staraya Artel	14	14	15	7	
22	....do	13	14	18	29	
24	East	22	17	15	16	
26	North and Staraya Artel	8	7	9	14	
29	Zapadni	13	4	4	17	
July 2	East, North, and Staraya Artel	18	3	10	5	
6	....do	9	4	7	7	
8	Zapadni	1	5	5	2	
10	East, North, and Staraya Artel	5	5	5	6	
14	....do	5	2			
16	Zapadni				1	
19	East, North, and Staraya Artel	13	2			
21	Zapadni	2	6	3	10	
23	East, North, and Staraya Artel	22	16	9	2	
27	....do	7	7	6		
31	....do	30	18	9		21
31	Zapadni	2	7	2	10	2
	Total	204	136	119	134	23

RESERVATION OF BACHELORS FOR BREEDING.

The quota of 2 and 3 year old bachelors to be marked and reserved for breeding purposes consisted of 1,000 of each of the foregoing classes in the proportion of 800 of each for St. Paul and 200 of each for St. George islands. These seals are driven and marked before the lessee is allowed to kill for skins.

On St. Paul seals did not appear in sufficient numbers to justify the marking of these animals until June 24. Thereafter drives were made as often as conditions justified, and the breeding-reserve quota finally was obtained on June 28. A list of the drives made on St. Paul, with the number marked from each, follows:

BREEDING RESERVE OF BACHELORS, ST. PAUL ISLAND, 1909.

Date.	Rookery.	Two years.	Three years.
June 24	Reef	358	348
27	Northeast Point	333	318
28	Zapadni	109	114
28	Tolstoi		20
	Total	800	800

On St. George the marking of the 400 young males was completed early in the season, the last of the quota being secured on or about June 26. The exact dates upon which the seals were marked and the number secured in each drive are not at hand.

QUESTION OF CLOSE KILLING.

After the Alaska Commercial Company had closed its twenty-year lease of the sealing privilege in 1889 there were intimations that to secure its quota in the last year the lessee was forced to drain the herd of every killable bachelor and to resort to unlawful practices to get 100,000 skins. The lease of the North American Commercial Company closed practically in 1909, when its last quota of skins was taken from the islands. To anticipate any questions that may be raised concerning the conduct of sealing during the last year of this as of the former lessee in 1889, it is desirable to discuss the matter here with a view of showing whether, in securing its quota of 1909, the last lessee either violated any law or regulation or did any injury to the herd.

It must be held in mind at the outset that no seals were killed on the islands in 1909 at any time except in the immediate presence of one or more government agents who scrutinized the killing closely and were ready to take active measures to secure enforcement of the law should any violation of it be attempted. Among the laws to be observed are prohibitions against the killing of any female seals or of male seals under 1 year of age. In addition, the regulations prescribe a total quota of 15,000, prohibit the killing of male seals with skins under 5 pounds or over 8½ pounds in weight, and of seals that have been marked and released for breeding purposes. All of these regulations were faithfully enforced by the government agents, who were actually present at each killing, and on the score of compliance with existing law the lessee may be said to be blameless.

There remains, however, the other question, whether, even while observing the law, the lessee killed closer than the safety of the herd would permit; or, in other words, whether the regulations are so loose as to allow such close killing in 1909 as would endanger the future increase of the seals. It may be well to consider this briefly.

It has been stated already that killing on St. Paul Island in 1909 averaged 69 per cent of all seals driven and on St. George Island 63 per cent. This killing was 4 per cent closer on St. Paul and 17 per cent closer on St. George than in 1908, which is to say a killing of about 66 per cent of all seals driven on the two islands. One-third, or 33 per cent, of all animals driven were released. With one animal released out of every three driven it is submitted that killing in 1909 was not close enough to endanger in any way the safety or future increase of the seal herd.

Another point of consideration is the number of animals released from the killing fields in 1909 as contrasted with the number necessary to be released to prevent decrease in the number of breeding

bulls present in 1909. In that year 1,399 breeding bulls were engaged actively with harems. The average life of the breeding bull is five years after he begins full rookery service at eight years. As the herd would thus renew itself in five years, a yearly diminution of one-fifth occurs and is necessary to be provided for. As the herd includes practically 1,400 breeding bulls, it would be necessary to insure that at least one-fifth of this number be provided five years hence, or 280 animals.

During the season of 1909 there occurred 5,831 rejections of seals from the drives. Of these 1,740 were too large to be killed thereafter and 4,091 too small to be killed or included in the breeding reserve. In addition to these there were a number of killables not driven at all, as on August 4 we discovered hauled among the cows on Tolstoi a drive of approximately 600 bachelors, the existence of which theretofore was unknown to the lessee. As the killing season closed on July 31, these animals could not be killed this season.

When we consider that only 280 bulls are required to mature each year to maintain the herd of breeding bulls at its present numbers and that at least 5,000 young males are believed to have survived the season, it can not be believed that the killing in 1909 was too close.

We must now discuss the question whether killing in 1909 was as close as in 1889. In the latter year no record of the number of the seals released from the killing fields was made. It is therefore not possible to ascertain the percentage of seals killed in 1889, nor to compare critically the killing of that year with that of 1909, for which we have exact data.

The main point of difference, however, between the methods practiced in the two years lies in the fact that regulations were in force in 1909 specially designed to prevent too close killing which were not in existence in 1889 and which in fact were not thought of in that year. Before any killing by the lessee was allowed in 1909 2,000 young killable males were reserved for breeding by the agents and marked so that thereafter they would be readily discernible by the clubbers. This reservation of 2,000 represents 13 per cent of the quota allowed the lessee. So that, before the lessee took a single skin in 1909, the herd was safeguarded by a reservation of males equal to 13 per cent of the quota. Under such regulations as these it is impossible at the present time for killing to be too close, even if, after reserving these killables, the lessee "swept the hauling grounds" to secure its quota. It could not sweep them so clean as to eliminate this 13 per cent breeding reserve unless the marked seals themselves were killed, and there is plenty of evidence to show that these marked seals were carefully guarded when they appeared in the drives.

Such killing as was done in 1909 was conducted strictly in accordance with law and regulations. The Government prescribed a quota of 15,000 for the lessee and virtually said: "After we have secured our breeding reserve, you are allowed to kill every seal on the hauling grounds that may be taken under existing law and regulations until you get your quota. We will see that you do not kill our breeding reserve; the law prohibits your killing females or seals under 1 year of age, and if you take skins weighing less than 5 or more than 8½ pounds we will not allow you to ship them, but will deduct them from the quota you would otherwise be allowed to ship." This was the exact situation in 1909, and in the killing no law or regulation was disregarded. During the lessee's killing season only 1 skin on St. Paul Island and 4 on St. George Island were taken contrary to regulations out of a total of over 12,000, and these seals were killed not designedly, but through accident.

From the foregoing it can be summed up: First, that every law and regulation safeguarding killing in 1909 was faithfully enforced; second, that one seal out of every three driven by the lessee in that year was released; and, third, that before any killing by the lessee was allowed a breeding reservation equal to 13 per cent of the quota was created and carefully guarded from slaughter. This, in my opinion, is sufficient evidence to convince even the skeptical that any charge of irregularity concerning the killing in 1909 can not be substantiated.

It is foolish to curtail the killing of bachelors on land while the islands are surrounded by a large fleet of pelagic schooners, hardly 3 miles offshore, ready to kill every seal that leaves the rookeries to go to sea. After providing an ample breeding reserve, it is good policy to kill every seal that may be killed with due regard to the safety of the herd. Restriction of killing on land should be discussed only after sea killing is stopped.

Personally I am in favor of killing on land even closer than 66 per cent, and of continuing such close killing until either the seals are reduced to a small number or the question of pelagic sealing is settled favorably.

MAINTENANCE OF QUOTA.

ANNUAL CATCHES SINCE 1903.

Since 1904 the annual quota of skins has been maintained at approximately 15,000. From this the natural assumption would be that the breeding herd of females has not diminished during this period, as otherwise the stock of bachelors would have decreased coincidently.

It is generally accepted that the sexes of seals are born in equal numbers. If the herd of bachelors has remained stable without

diminution during these years, we must accept the conclusion that the number of breeding females which produce these bachelors also have remained at a state of equilibrium, notwithstanding the heavy killing of females in the open sea by pelagic sealers.

Since 1903 the annual catches of bachelors on the islands have been as follows, the figures given representing the annual shipments of skins from the islands by the lessee:

1903	19,292
1904	13,128
1905	14,368
1906	14,476
1907	14,964
1908	14,996
1909	14,331

From an examination of these figures it appears that the lessee took over 19,000 skins in 1903; that its catch dropped to 13,000 in 1904, and that annually thereafter it killed practically 15,000 seals until 1909.

If these figures were susceptible of no other explanation than that the number of bachelors had not diminished, this conclusion would have to be accepted without argument. If, however, other facts have relevancy in a consideration of the cause of this stability of the catch, they should be examined before the conclusion is accepted that no decrease in the breeding herd has occurred during this period.

ANALYSIS OF CONDITIONS.

Previous to 1904 no restriction upon the size of bachelors to be killed was enforced. The annual quotas allowed were so ample as to carry permission to kill every available bachelor appearing in the drives. In its operations the lessee killed every 4-year-old, every 3-year-old, and every 2-year-old driven up that had not a defective skin. Its rejections of seals from the killing fields were confined to those seals only with bad skins, to those young wigs too large for the market, or to such few yearlings as appeared in the last drives of the season. All other male seals were killed. In 1903 the rejections of small seals numbered only 1,185 on St. Paul, and at least one-fourth of these were dismissed from the two food drives made by the government agents during the period between August 1 and 10. With so small a proportion of rejections in 1903 and the large catch of that year, we must conclude that the lessee killed almost every available seal that appeared. Furthermore, it anticipated its next year's catch by killing all of the 2-year-olds that hauled up and that could be driven. Such as escaped were killable the following year as 3-year-olds. The lessee, in plain

terms, was "living from hand to mouth," killing all it could get and saving none; depending for its next year's catch solely upon the increment of 2-year-olds and such larger seals as had accidentally escaped clubbing the year previous. Such practice could be termed too close killing.

In 1904, on the other hand, occurred for the first time the enforcement of the regulations designed to prevent too close killing, by the exemption of 4-year-olds from slaughter, the establishment of a minimum weight of 5½ pounds on sealskins to be taken, and a reservation of 2,000 young males for breeding purposes. These regulations of 1904 changed completely the conditions surrounding the killing of seals on the islands. It reduced the catch in one year from 19,000 to 13,000, created through dismissals a reserve of 7,500 young males to maintain the quota for succeeding years, and provided means for insuring recruits to the rapidly decreasing stock of breeding bulls. The change amounted to a transition from the condition of practical nonregulation of killing to one of careful regulation.

Since the quota was reduced in one year (1903–4) from 19,000 to 13,000, not by natural conditions, but by the enforcement of arbitrary restrictions upon the catch, it might well follow that the catches of other years as well were influenced by other agencies than the natural state of the herd. For this purpose a brief résumé of the conditions attending the several years' killings will be made:

1903.—The lessee shipped over 19,000 skins and on St. Paul Island only 1,185 small seals were released from the killing field.[a]

1904.—After the enforcement of the regulations requiring the exemption of 4-year-olds from killing, the establishment of a 5½-pound minimum weight, and the reservation of young males for breeders, the number of skins shipped as quota was reduced to 13,128. On the other hand, the rejection of small seals amounted to 10,181. These 10,181 rejections created a reserve of surplus bachelors which, as 3-year-olds, would aid the catch of 1905, and emphatically relieved the situation as regards close killing.

In view of this large number of rejections it is not proper to say that the lessee could not have secured its quota in this year. The reason why 15,000 were not taken instead of only 13,000 is due to the fact that such great caution was enjoined upon the lessee in securing the enforcement of the new regulations that seals which were properly killable were allowed to escape.

1905.—In this year 14,368 skins were shipped. The St. Paul quota of 13,000 was secured, with 59 per cent killed of the whole number driven, while the St. George Island quota, 2,000, was not obtained. As the percentage of killed on this latter island was, however, only

[a] Records of rejections on St. George for 1903 are incomplete.

26, it must be concluded that enough eligible seals escaped from the killing fields to have filled the quota.

In 1905 the reserve of bachelors was further maintained by over 10,000 rejections of small seals made during the lessee's sealing season. As the quota of 1905 was aided by the large number of rejections in the preceding year, so the 1906 quota must be considered as aided by a similar number of rejections in 1905.

1906.—For this year a quota of 14,476 was shipped, of which 12,536 were secured from St. Paul Island toward its quota of 13,000, while 1,940 were shipped from St. George Island toward its quota of 2,000. The percentage killed on St. Paul was 59, while on St. George it was 51, an increase on the latter island over the preceding year of 25 per cent. In this year occurred, in addition, an important change in the regulations, namely, that the minimum weight of skins to be taken was reduced from $5\frac{1}{2}$ to 5 pounds. This had the effect of allowing the killing of several thousand young seals which heretofore would have been released and included in the reserve of young males from which a portion of the next year's catch would be obtained. With this material aid, however, the quota on St. Paul was not secured.

We find here a decided decrease in the bachelor herd. To secure the quota on St. George Island killing had to be 25 per cent closer than the year previous, even when aided by the reduction in the limit of weight and the savings of bachelors from previous years. In spite of the reduction in weight the quota could not be obtained on St. Paul Island. Had the number of bachelors in existence remained the same in 1906 as in 1905 the reduction of the minimum weight and the consequent inclusion among the killables of several thousands of young males of a size hitherto exempt would have made it possible to secure the quota before the expiration of the sealing season. But it is a fact that it was not possible to secure the St. Paul quota even by sealing until the last day and with the minimum weight lowered to 5 pounds. This certainly shows that fewer bachelors were on St. Paul in 1906 than formerly.

The rejections from the sealing fields in 1906, of course, were affected by this lowering of the weight, and were 7,217, as against over 10,000 in 1905, a loss of over 3,000. This, however, was still large enough to save a number of bachelors for the next year's quota.

1907.—Practically the entire quota of 15,000 was obtained and was secured before the end of this season—the condition which should have occurred in 1906 had not a scarcity of bachelors been encountered then. St. Paul's quota of 12,400 was obtained by July 28, while St. George's 2,600 was obtained by July 24. The lessee killed more closely, however, as shown by the percentages of killed—68 for St. Paul and 44 for St. George. The rejections from the killing

fields, also, were less numerous by 2,500 than in 1906. This shows at least that the seals had not increased. It is not out of the way, however, to infer that no decrease in the bachelor herd had occurred since 1906.

1908.—The entire quota of 15,000, practically, was obtained this year, but only after sealing on St. Paul until the end of the season. The St. George quota, however, was obtained by July 25. The percentage of killing on St. Paul was 5 less than the year before, while that of St. George was 2 greater. The number of small rejections in this year was 6,092, or in round numbers 1,300 more than the preceding year. There is everything in the killing statistics of this year to show that the bachelor herd did not diminish in the interval between 1907 and 1908.

1909.—A decided decrease is apparent in the record of this season. Not only was the quota not secured, but the rejections from the killing field were less than at any time since 1903.

The number of skins secured and shipped was 14,368, of which 37 were charged to the preceding year. The percentage of killed was 69 on St. Paul, an increase of 4 per cent, while on St. George it was 63, or 17 per cent more than 1908. The number of small rejections was only 1,416 in addition to 2,675 rejections of marked bachelors, or 4,091 in all, as against 6,092 the year before.

As, outside of the breeding reserve, only 1,416 rejections of small seals were made in 1909, we may safely consider the bachelor reserve to have been almost eliminated.

SUMMARY AND INTERPRETATION OF CONDITIONS.

After this more or less detailed analysis of the killings during the years since 1903 we may summarize the main points as follows:

1. The quotas for 1904 and 1905 were not obtained because of stringent enforcement of regulations designed to prevent close killing.

2. These regulations were partially relieved of their severity in 1906, when the minimum weight was reduced to 5 pounds. Nevertheless, in this year the quota was not secured because of scarcity of seals.

3. In 1907 and 1908 the quotas were secured without special difficulty, although the rejections from drives were lessened from the number in 1906.

4. In 1909 not only was the quota not secured, but the rejections were less than at any time since 1903, and the percentage of killing was higher.

We may reasonably infer that in 1904 a quota of 15,000 was less than the herd would have afforded had the same methods of close killing been continued as were followed in 1903 and previously. From the statistics we might gather that the catch of 1904 under

the same conditions would have been nearly what it was in 1903. Yet we can not say that 19,000 seals, or anything near that number, could have been secured in 1909. In other words, the herd has gradually decreased since 1903 from a point where it allowed a catch of over 19,000 to a point, in 1909, where it could not afford 16,500, if we count the bachelors marked for breeding as a portion of the yield of the herd. We have marked decreases in 1906 and again in 1909, with a probable equilibrium between those years. But the trend of the bachelor herd has been toward gradual decrease, and this can be better understood when an observation is extended over a period of years.

The question presents itself: How, if a gradual decrease occurred, was the quota maintained at approximately the same number? The answer is that the quota of 15,000, when first fixed, was smaller than the yield of the herd; that the quotas of the years following were aided in large part from the rejections from previous years, and that not until 1909 did the herd diminish to a point where it could not yield 15,000 skins annually. It was really not until 1909 that the rejections became practically nil, and even with that the quota could not be filled.

It is with considerable hesitancy that I advance this conclusion that the decrease in the herd of breeding seals has been less rapid than would otherwise appear. During the period following 1903 whole rookery areas gradually have been denuded of breeding seals, the rookeries themselves have shrunk, and massed areas of breeding seals have become smaller. Every other indication would point to the supposed fact that the breeding herd had diminished more rapidly than the catches of bachelors would indicate. As it stands, however, a material decrease in the herd is apparent in the inability of the lessee this last season to secure a quota of skins which could have been taken without undue effort in 1903.

EFFECT OF SAVING 2-YEAR-OLDS.

When, in 1904, the catch of skins was reduced by regulation from 19,000 to 13,000, a large number of small bachelors was released. As stated heretofore, this catch of 13,000 did not represent by any means all the skins the lessee could have taken had the same methods of close killing as practiced in preceding years been permitted. Had the lessee been allowed in 1904 to sweep the hauling grounds of every bachelor appearing there, as in 1903, the catch for 1904 would nearly have equaled that of the preceding year.

As this decrease in the catch in 1904 had its cause solely in the enforcement of certain arbitrarily restrictive measures, it had no connection with the number of breeding females in the herd. Its effect was to create a reserve of young animals numbering probably 7,500.

The result of the creation of this reserve was to place the herd in a condition which represented more nearly what might be termed its normal status, and, secondly, it insured a certain stability of the next year's catch of skins independently of that year's increment of young killables.

The normal status of the bachelor herd is reached when the greater portion of the take of skins consists of 3-year-olds. The reason for this lies in the fact that a 3-year-old has a prime skin that brings the highest price in the market. As the 3-year-old skin is more valuable than that of a 2-year-old, it follows that proper management should maintain such conditions as would result in the catch being secured mainly from the prime or 3-year-old skins, rather than from the less valuable 2-year-olds. This can be done only by the maintenance of a reserve of 2-year-olds which, being protected from slaughter at that age, would furnish the proper number of 3-year-old skins the following season.

The immunizing from killing of this large number of 2-year-olds in 1904 resulted in bringing nearly that number of prime 3-year-olds back to the islands in 1905. The effect was to permit the catch of 1905 to be composed of 50 per cent of prime 3-year-old skins, whereas previously only a thousand or so of 3-year-olds were included. That the value of the company's catch was enhanced by these methods of selection is shown by the fact that the average selling price of their skins in 1904 and 1905 was $37, while in 1903 it was only about $29.50.

When the lessee, as in 1903, swept the hauling grounds of every bachelor appearing there, necessarily many small seals were killed whose skins would bring much less than those of the prime 3-year-olds. This, of course, was waste. Although deprived of some of these small seals in 1904 by the operation of the regulations, the lessee received back in 1905 such a number of prime 3-year-olds that the loss of one year was more than equaled by the gain of the next, with the added advantage of having to kill fewer animals to secure the same profit.

When such a reserve of young bachelors is created, thereby insuring in a degree the permanency of the next year's catch, this reservation would have the effect of obscuring, to a degree at least, any decrease in the breeding herd that would cause fewer young males to appear upon the killing field.

When, for example, as in 1903, the lessee depended for its catch mainly upon the influx of 2-year-olds that theretofore had been too small to kill, its catch had close relation to the number of breeding cows that, two seasons previously, had brought forth the 2-year-olds it expected to kill. It could look nowhere else for its catch. If the births two years previously were more numerous the catch would be larger; if less numerous the catch would be smaller. Under these

conditions the catch of any year would be quickly responsive to a lessening or enlarging of the number of births two years previously.

With the creation, however, of a reserve of bachelors, the lessee would be able to expect a portion of its catch from this reserve instead of from the increment from the breeding herd alone. As it would be justified in counting upon a considerable number of 3-year-old skins from the reserve, a correspondingly smaller number of 2-year-olds from the increment of young seals would be needed to complete its quota.

This indicates that the maintenance of a bachelor reserve would obscure to a degree the effect on bachelors of a reduction of the breeding herd. Without this reserve the shrinkage would be quickly felt; with it, however, the loss in new seals would be met by the bachelor reserve and the catch maintained. This is one of the reasons why the land catches on the Pribilof Islands have been maintained at a relatively stable figure since 1904, and the reduction in the number of young seals, resulting from a depletion of the breeding cows, not immediately indicated by a simultaneous reduction of the bachelor catch.

REDUCTION OF BACHELOR RESERVE.

It must not be overlooked that the bachelor reserve represented by the number of small rejections from the killing field has been almost eliminated. Beginning in 1904 with over 10,000 rejections of these males, the reserve has fallen steadily to 4,000 rejections in 1909, including those among the marked bachelors. Its steady diminution during this period apparently indicates that to maintain the quota at a stable figure this reserve had to be drawn upon more heavily every succeeding year; or conversely, the rejections each year became fewer in order to secure the quota. It certainly is true that a steady but gradual reduction occurred in the number of bachelors rejected, and had such reduction not been made the quota would have suffered.

The reduction of this reserve will make it a matter of difficulty to secure a quota in 1910 approaching in size that of 1909. With fewer of the older animals to draw upon, dependence will be had mainly upon the young or 2-year-olds. With the chance that there will be fewer of these than in 1909, it would appear problematical whether enough can be found to equal or approach the catch of 1909.

RATIO OF BACHELORS TO WHOLE HERD.

In 1897 the investigation made by the commission of which Dr. David Starr Jordan was chief disclosed a ratio of bachelors to the whole herd of 1 to 20. That ratio was used by him in his criticisms of the accuracy of H. W. Elliott's censuses based on acreage measure-

ments in 1874 and 1890. Subsequently, as stated in Mr. E. W. Sims's report[a] on the seal islands, in 1906, the relation of bachelors to the whole herd in 1904 and 1905, according to the censuses made by the agent in charge of seal fisheries for those years, was found to be, respectively, 1 to 16 and 1 to 14.

In 1909, by such methods of computation as are available, the whole herd of seals numbers approximately 133,000, while the catch of bachelors was 14,331. Added to the latter, to form an idea of the total bachelor yield of the herd, should be 2,000 bachelors marked and released, making a total possible catch of bachelors for 1909 of 16,331. When we contrast this yield of bachelors for 1909 with the number of the whole herd in that year, we have a relation of bachelors to the whole herd of 1 to 9. The following table will show the various ratios for the years mentioned:

RATIO OF BACHELORS IN CERTAIN YEARS.

Year.	Bachelors killed.	Whole herd.	Bachelors released.	Ratio of catch to whole herd.
1897	20,766	402,850	.....	1 to 20.
1904	13,128	243,103	2,054	1 to 16.
1905	14,368	223,009	2,174	1 to 14.
1909	14,331	133,000	2,000	1 to 9.

This would show that the ratio which the catch of bachelors bears to the whole herd has changed from 1 to 20 in 1897 to 1 to 9 in 1909.

The percentage of bachelors dismissed from the killing field in 1897 was 41 per cent; in 1904, 44 per cent; in 1905, 40 per cent; and in 1909, 32 per cent. This shows that killing in 1909 was 9 per cent closer than in 1897, and would account partially for the difference in the ratio, but not altogether, in my mind. Had killing in 1909 been no closer than in 1897 (59 per cent), the whole number killed would have been 10,603, which, added to the number marked and released, would have made a ratio of 1 to 11 in 1909.

This demonstrates that there was in 1909 a larger proportion of bachelors present to the whole herd than was shown to be present in 1897. In fact, the proportion seems to have increased gradually since 1897. Why this is so is difficult to explain. With a gradually diminishing herd, the number of bachelors proportionately has increased so that the annual catches of skins do not show the same rate of diminution as the herd in general.

It may be possible that the death rate among young pups has been lessened. It has been estimated heretofore that 50 per cent of pups die in their first migration, or rather that only 50 per cent reappear as yearlings the year after their birth. This was supposed to be due to

[a] Report on the Alaskan Fur-Seal Fisheries, by Edwin W. Sims, Department of Commerce and Labor, August 31, 1906.

their inability as pups to provide food for themselves and to escape from their natural enemies. It was due also to a heavy death rate among these pups on shore from disease. It is altogether probable that the death rate from disease on shore that affected pups in 1897 has since been reduced greatly through the abandonment by seals of areas that were supposed to be infected. This would allow a greater number of pups to return as yearlings than heretofore and would increase the number of bachelors in proportion to the whole herd. It would also insure the return of a greater number of yearling females, and would assist in maintaining the breeding herd despite pelagic killing of cows. It is possible also that the allowance of a 50 per cent mortality in pups was too high even in 1897, but I am inclined to believe rather that the death rate has changed since then and that more pups survive now than formerly.

The proportion which the pelagic catch bears to the whole herd has changed also. In 1897 the pelagic catch, 24,321, bore the same relation to the whole herd, 402,850, as 1 to 16. In 1908 it was as 1 to 8 (18,151 : 146,636). From this it would seem that the pelagic sealers are killing twice as many seals in proportion as they did eleven years ago. This is another singular fact in connection with the subject, showing that conditions at the present time differ entirely from previous years.

It may be that by the methods of estimation used, the number in the whole herd in recent years has been placed too low, or rather, that there are more seals in the herd than are given in the estimates or censuses. It is either in this possibility or the one already mentioned—that the mortality among pups is less than hitherto—that the cause of this change of relation of bachelor catch to the whole herd must be sought.

NUMERICAL STATUS OF THE SEAL HERD.

COUNTS OF HAREMS AND BULLS.

The usual counts of harems were made on the two islands during the period of July 13–16. These counts were made by the agents and a special representative of the Bureau of Fisheries, Mr. G. A. Clark, and were made carefully. The count for St. Paul Island follows:

COUNT OF HAREMS ON ST. PAUL ISLAND, 1909.

Date.	Rookery.	Harems.	Idle bulls.	Quitters.	Water bulls.	Bulls on hauling grounds.
1909.						
July 12	Lagoon	12	3	1	.....	.....
12	Northeast Point	229	33	[a] 42	.....	.....
12	Little Polavina	19	2	1	.....	.....
12	Polavina Cliffs	23	.....	1	.....	.....
12	Polavina	42	3	15	.....	.....
15	Gorbatch Cliffs	2	1	.....	.....	.....
15	Gorbatch	118	20	6	.....	20
15	Ardiguen	11	2	.....	.....	.....
15	Reef	184	13	22	.....	32
15	Tolstoi Cliffs	25	4	1	.....	.....
15	Tolstoi	87	14	5	.....	7
15	Ketovi	51	9	3	6	.....
15	Amphitheater	7	3	.....	.....	.....
15	Lukanin	41	3	1	4	.....
16	Zapadni Reef	11	1	1	.....	.....
16	Little Zapadni	62	9	4	.....	9
16	Zapadni	147	20	13	3	15
16	Sea Lion Rock	61	.....	.....	.....	.....
	Total	1,132	140	116	13	83

[a] Includes water bulls.

Contrasting the total number of harems and bulls found on St. Paul Island in 1909 with the number found in 1908, exclusive of Sea Lion Rock, the following changes are to be noted:

COMPARISON OF HAREMS, ST. PAUL ISLAND, 1908 AND 1909.

Year.	Harems.	Idle.	Quitters.	Water bulls.	Hauling-ground bulls.
1909	1,071	140	116	13	83
1908	1,062	90	45	68	.....
Difference	+9	+50	+71	−55	.....

On St. Paul Island, therefore, while there occurred an increase of only 9 harems between 1908 and 1909, the total number of adult bulls present on the rookeries (harem masters, idle, and quitters) was increased by 130 individuals.

On St. George Island, in 1909, harems were counted on July 14–16 by the agents, and later these counts were verified by one of the agents and Mr. G. A. Clark. A detailed list of the bulls found on St. George Island, as disclosed by the counts mentioned, follows:

COUNT OF HAREMS ON ST. GEORGE ISLAND, 1909.

Date.	Rookery.	Harems.	Idle bulls.	Quitters.	Hauling-ground bulls.
1909.					
July 14	Little East	5			
14	East Reef	25		6	
14	East Cliffs	42		5	
14	Staraya Artel	42	10	7	
16	Zapadni	44	9		15
15	North	109	13	5	
	Total	267	32	23	15

A comparison between the totals of 1908 and 1909 shows the following changes as having occurred on St. George:

COMPARISON OF HAREMS, ST. GEORGE ISLAND, 1908 AND 1909.

Year.	Harems.	Idle.	Quitters.	Hauling-ground bulls.
1909	267	32	23	15
1908	241	34	27	(a)
Difference	+ 26	− 2	− 4	

a No data.

It may be noted from the above table that an increase of 26 harems occurred on St. George Island, or 10 per cent. The idle bulls and quitters show a slight decrease.

For the two islands, therefore, the counts made in 1909 show a net increase of 35 harems, 48 idle bulls, and 67 quitters, or a total of 150 full-grown bulls.

It may be noted that the water bulls on St. Paul Island decreased 55 between 1908 and 1909. These are the immature 5 and 6 year olds hanging about the water fronts of rookeries. They are not breeding bulls because they are not stationed in positions where they may serve cows, although in the fall they will haul up on the rookeries and annoy the cows after the adult breeding bulls have relaxed their vigilant harem control.

The decrease in this class of animals may have been caused by the possible fact that, at the particular time these counts were made, weather conditions or some other cause may have operated to bring fewer of these animals on shore than normally.

It is more probable, however, that this decrease has its cause further back than the present summer and is due to more tangible

reasons. It can be sought in the large number of young seals released from the killing fields in 1904 and following years.

In that year (1904), according to the statistics of rejections, 8,019 small seals were released uninjured from the drives brought to the killing fields, in addition to 2,162 young seals marked and released for breeding purposes. This made a grand total of 10,181 young seals released in this one year (1904). In 1905, 10,288 rejections of the same character were made.

Take, for example, the 2-year-olds of 1904, of which there were approximately 8,000 rejections. These seals would be 3-year-olds in 1905, 4-year-olds in 1906, 5-year-olds in 1907, and 6-year-olds in 1908. The 2-year-olds of 1905 would be 5-year-olds in 1908, one year behind those of 1904.

Theoretically, therefore, in 1907 and 1908 we would have a large number of young males which would be either 5 or 6 year olds. At this age they would be true water bulls—not old enough to fight their way upon the rookeries to serve cows, but old enough to be obsessed by the breeding instinct and to loiter about the water fronts of rookeries flirting with cows coming and going to feed. For this reason, in 1907 and 1908 we should have had more of this class of young males than hitherto.

A reference to the annual reports of 1907 and 1908 will show that this increase occurred. In 1907, 100 water bulls were noted on the rookery fronts of St. Paul Island, where, before, the number was so small as to fail to suggest the advisability of enumeration. In 1908 only 68 water bulls were noted, and from this it is to be inferred that some of the water bulls of 1907 graduated into the idle bull or 7-year-old class of 1908. This is further borne out by the increase of 29 idle bulls in 1908. In 1909 these young bulls should have progressed into active harem masters and increased the number of harems. This is also borne out by the fact that in 1909 on St. Paul Island an increase of 9 occurred in the number of harems, the first increase in the number of harems that has occurred on St. Paul for years.

But why should the supply of 5 and 6 year old males be less in 1908 than in 1909? Because the practice of releasing 10,000 annually from the killing fields was continued only through the years 1904 and 1905. In 1906 only about 7,000 were released, and in 1907 only about 4,000. This lessening of the number of rejections in previous years must find its echo in the lessening number of young bulls apparent several years thereafter.

PURPOSE OF BREEDING RESERVATION.

Since 1904 an annual reservation has been made of 1,000 3-year-old males, together with 1,000 2-year-old males designed to insure a supply of 3-year-olds the season following. The purpose of this

reservation is to supply young males in sufficient numbers to meet the heavy death rate which has been demonstrated by experience to occur among adult rookery bulls. The heavy mortality among this class of fur seals has been apparent in the steady decrease in the number of bulls present on rookeries during observations extending over ten years. To check this decrease, by providing a sufficient increment of young bulls, was the object of the plan of reserving young male seals by marking them in such manner as to prevent their being killed by clubbers on the sealing fields.

During the six years from 1904 to 1909, both inclusive, 12,000 young males have been so reserved. Of these, 6,000 were 2-year-olds and 6,000 3-year olds at the time of reservation. As those seals reserved in 1904 and 1905 now would be coming upon the rookeries as breeders, it is both interesting and desirable that we should form an idea of the number of these young bulls we should expect to appear upon the rookeries.

Any attempt to compute the number of reserved 2-year-olds which might survive as breeders would be futile, the mark put upon them not being permanent and protecting them only for the first year. These 2-year-olds were reserved solely for the purpose of insuring a supply of 3-year-olds the next year and to prevent too close killing. It was understood at the time the plan was inaugurated that the 2-year-olds would be liable to be killed the following year. Their exemption from slaughter as 2-year-olds, however, would insure their presence the next year as 3-year-olds, and these latter were depended upon to form the actual breeding reserve. For this reason, therefore, in attempting to compute the probable increase, only the reservation of 3-year-olds should be considered and not that of the 2-year-olds, the reservation of which acts merely as a "feeder" to that of the 3-year-olds.

The 3-year-olds, on the other hand, become 4-year-olds the next year, the killing of which is prohibited by regulation. Thereafter they are too large to be killed by the clubbers. Few of them, in fact, appear later upon the field, but instead frequent the rookery fronts worrying the cows. This class of young males, therefore, we may safely attempt to follow through succeeding years and to estimate what number might be expected to appear from year to year thereafter.

INCREASE OF BULLS THROUGH RESERVATIONS.

During the six years mentioned 6,000 3-year-olds were reserved for breeding, 1,000 each year. To follow their progress through the years following, allowance should be made for a 10 per cent mortality from natural causes. What mortality they suffer from pelagic sealing, although severe, need not be dealt with here, as our object merely

is to decide how many of these bachelors under normal conditions might be expected to mature as bulls.

A table constructed on this basis follows:

INCREMENT OF BULLS FROM BREEDING RESERVATIONS.

Age.	1904.	1905.	1906.	1907.	1908.	1909.
3-year-olds	1,000	1,000	1,000	1,000	1,000	1,000
4-year-olds	.....	900	900	900	900	900
5-year-olds	.....	.....	810	810	810	810
6-year-olds	.....	.....	.....	729	729	729
7-year-olds	.....	.....	.....	.....	647	647
Adult bulls	.....	.....	.....	.....	.....	583

From this table we can see that, theoretically, we should have in 1909, from the reservations of 3-year-olds made in 1904 and 1905, an increment of 583 adult, or 8-year-old bulls, and 647 7-year-olds, or quitters. This does not mean, of course, that the number of bulls present in 1908 would be increased by the number of new bulls noted above. A number of the 1908 bulls would have died by the following year. It means that this number of young bulls would be available to offset the mortality among adult bulls occurring during the interval between the seasons of 1908 and 1909. Any increase in bulls noted in the latter year would represent the excess of incoming young bulls over the loss by death of old bulls.

It will now be interesting to note to what degree this theoretical computation agrees with the facts as demonstrated by the actual counts made during the last season. The table shows that 583 new full-grown bulls should be present in 1909. The count of harems made in 1909 shows that the number of harems in 1908 has been maintained and that we have in 1909 an increase of 35 harems on the two islands, and of 48 full-grown adult bulls that were without cows, a net increase in adult bulls of 83, in addition to an increase of 67 in the 7-year-old quitter class.

This actual increase in the number of bulls shows that the theoretical computation is correct in so far as to indicate a comfortable increase in bulls in 1909. The number of these new bulls that did actually take station on the rookeries is undeterminable, and to that extent we can not verify the table. We do know that a number of young bulls had harems in 1909 for the first time, and that these incoming young bulls were sufficient not only to fill the gaps created by the death of old bulls but to increase the actual number apparent on the rookeries by 83 harem masters and idle. When we consider further the increase of 67 quitters, or 7-year-olds, a total increase of 150 breeding males, we may feel that we have received, in a modified degree at least, the benefit of the reservations which the theoretical computation indicates should have been felt.

Of course, not a few individuals of the reservations of 1904 and 1905 were killed by pelagic sealers. Those of 1904 now living had to elude the efforts to capture them in the sea made during a period of six years. The cumulative effect of six years' sea hunting upon a given class of animals, such as these young males released in 1904, must be severe enough to deplete the original number materially. No one will claim that of the original 1,000 3-year-olds released in 1904 all came through to adult estate with a loss attributable only to natural mortality. Quite a large percentage died from pelagic sealing, but enough escaped the vicissitudes of seal life not only to fill all the places made vacant by the deaths of old bulls, but to reenforce that class to the point of actual expansion.

Notwithstanding the assured success of this experiment of reserving young males, it may be claimed that the result should have been more pronounced, or, in other words, that more bulls should have appeared than actually did. Theoretically more should have appeared, but our theories are based upon the knowledge of only a few facts connected with seal life after the seals leave the land. What the actual mortality is among these animals from their natural enemies and pelagic sealing can not be ascertained, but undoubtedly it is large. From the experiment we have learned simply that a reservation of 2,000 bachelors will not deliver the entire number on the rookeries as bulls five years hence, and that, if we want more bulls than actually appeared, we must have a larger reservation.

SIZE OF RESERVATION TO EFFECT INCREASE IN BULLS.

In 1904 there were approximately 2,300 adult bulls on the rookeries, and in that year the first reservation of 1,000 3-year-olds was made. No account is taken of the 1,000 2-year-olds made at the same time, for the reason already given that these latter are always liable to be killed the succeeding year on land and were reserved for the purpose merely of insuring a supply of 3-year-olds for the next year's reservation.

These 1,000 3-year-olds represented nearly 50 per cent of the number of active breeding bulls present in 1904. When the years necessary for their full growth had passed it is found that the increment of the survivors of this 50 per cent reservation was sufficient only to form a slight excess over the number of bulls present the preceding year. In other words, it is found that a reservation equal to 50 per cent of the adult bulls present was hardly more than enough to meet the drains from the usual mortality among rookery bulls.

From these facts, hardly sufficient though they be, we might deduce the tentative principle to be observed in future, should further effort be made by reservation of 3-year-olds to meet and check

a steady decrease in rookery bulls, namely, that such reservation must equal at least 50 per cent of the adult bulls in existence at the time the reservation is first made.

CHANGE IN HAREMS BY ROOKERIES.

We have seen from the foregoing that an increase of 9 harems occurred on St. Paul Island and of 26 on St. George Island. This increase represents a percentage of only eight-tenths of 1 per cent on St. Paul and of over 10 per cent on St. George. The counts disclose an increase upon all the rookeries on St. George excepting one, and that one, Little East, is the same as in 1908, while on St. Paul only 1 of the 4 large rookeries (Gorbatch) shows any increase whatever. With this single exception, such increase on St. Paul as did occur took place on the smaller rookeries.

A count of the bulls on all rookeries in 1908 and 1909, with a statement of the changes occurring during the interval, follows:

COUNT OF BULLS ON ALL ROOKERIES, 1908 AND 1909.

Rookery.	Harem.		Increase (+) or decrease (−).
	1908.	1909.	
St. Paul:			
Ardiguen	8	11	+ 3
Reef	200	184	−16
Ketovi	42	51	+ 9
Amphitheater	6	7	+ 1
Lukanin	44	41	− 3
Tolstoi	88	87	− 1
Tolstoi Cliffs	20	25	+ 5
Lagoon	13	12	− 1
Northeast Point	237	229	− 8
Little Polavina	16	19	+ 3
Polavina Cliffs	24	23	− 1
Polavina	36	42	+ 6
Zapadni	148	147	− 1
Little Zapadni	64	62	− 2
Zapadni Reef	10	11	+ 1
Gorbatch Cliffs	3	2	− 1
Gorbatch	103	118	+15
St. George:			
Little East	5	5	.....
East Reef	20	25	+ 5
East Cliffs	41	42	+ 1
Staraya Artel	41	42	+ 1
Zapadni	40	44	+ 4
North	94	109	+15

This fact, that the rookeries on St. George Island show increase in bulls in a marked degree, is strongly corroborative of the tentative conclusion advanced by me in 1908, that the continued disturbance of seals in the water about St. Paul Island by the pelagic sealers has had the effect of driving off seals to the other island, where they suffer but little annoyance from the sealers. In 1908 the change in the habits of the bachelors in hauling on the Reef, where they were least disturbed, in preference to Northeast Point, where two-thirds of the

fleet gathered, was plainly noticeable. This year the fleet gathered mainly off Southwest Point, and as a result no large drives were made from the Reef, as was the case in the two years preceding, while as many bachelors were found at Northeast Point as at any other rookery. This situation in 1909 is more a return to normal than a change, but indicates that seals can be influenced in hauling by conditions extraneous to their normal environment.

The cause of the fact that the increase in bulls on St. Paul occurred only on smaller rookeries excepting one, might lie in the fact that on the smaller rookeries the young bulls had a better opportunity of lodgment close to the cows than on the larger ones, where the average harem was smaller.

COUNTS OF PUPS AND AVERAGE HAREM.

Counts of pups were made last summer on several rookeries with the object of determining whether or not the breeding females have diminished, as well as the size of the average harem, by means of which estimates of the whole number of breeding cows on the two islands might be made.

St. Paul Island.—Counts of pups were made upon certain rookeries on St. Paul in 1909 and are detailed in the following table:

COUNTS OF PUPS ON ROOKERIES OF ST. PAUL ISLAND, 1909.

Date.	Rookery.	Live pups.	Dead pups.	Total.
1909.				
Aug. 2	Ketovi	1,669	60	1,729
2	Amphitheater	246	4	250
4	Lagoon	693	22	715
4	Tolstoi Cliffs	1,397	55	1,452
4	Zapadni Reef	309	10	319
	Total	4,314	151	4,465

It was originally my purpose to count the pups on only Ketovi and Amphitheater, omitting all other rookeries, to avoid driving into the water any greater number of breeding cows than necessary. Counts of other rookeries were made, however, at the request of Mr. G. A. Clark, special representative of the Bureau of Fisheries, for comparison of their present condition with their status in 1897, when the pups thereon were counted by the fur-seal commission.

The rookeries on which pups were counted on St. Paul in 1909 contained 106 harems at the height of the breeding season. As 4,465 live and dead pups were found on the same area, and as each pup represents a breeding cow, each harem on this space would have on an average 42.1 cows.

This represents, as has been stated, an average harem based on the entire count of pups made. The average harems on the individual rookeries vary greatly. The average harem on Zapadni Reef is 29, while that on Lagoon is 59.5. Tolstoi Cliffs, on which 1,452 pups were found, had an average harem of 58. For convenience, the average harem on each rookery on which pups were counted is given below:

AVERAGE HAREMS ON ROOKERIES ON ST. PAUL ISLAND.

Rookery.	Live and dead pups.	Harems.	Average harem.
Ketovi and Amphitheater	1,979	58	34.1
Lagoon	715	12	59.5
Tolstoi Cliffs	1,452	25	58.0
Zapadni Reef	319	11	29.0
Total	4,465	106	42.1

On St. Paul in 1908 the pups on Ketovi and Amphitheater only were counted. For this reason, comparison between the counts in 1908 and 1909 can be made only for these rookeries. Such comparison shows:

COMPARISON OF COUNTS OF PUPS, ST. PAUL, 1908 AND 1909.

Year.	Rookery.	Live pups.	Dead pups.	Total.
1908	Ketovi and Amphitheater	1,877	83	1,960
1909	do	1,915	64	1,979
	Increase			19

The difference between the number of pups embraced in these two counts is 19, representing an increase in 1909. This indicates that practically no change has occurred in the numbers of cows on this rookery between the years 1908 and 1909.

St. George Island.—A count of pups was made in 1909 on North rookery on St. George as has been done for several years.

COUNTS OF PUPS ON ST. GEORGE ISLAND, 1908 AND 1909.

Year.	Rookery.	Live pups.	Dead pups.	Total.
1909	North	3,679	105	3,784
1908	do	3,969	154	4,123
	Decrease			339

The count for 1909 shows that a decrease has occurred in the number of pups on that rookery since 1908 amounting to 339, or 8 per cent.

Using the same methods as were employed in determining the average harem on St. Paul Island, it is found that the average harem on North rookery, St. George Island, in 1909 was 34.7 (109 harems, 3,784 cows).

Had the pups on other rookeries on St. George Island been counted, a different average harem would have been obtained. While North and Staraya Artel rookeries have remained practically stable in numbers for several years, the area covered by the breeding seals on Zapadni, St. George Island, is less this year than formerly, in addition to which only 1,100 cows were counted there at the height of the season of 1909, whereas over 1,500 were counted there on the same date in 1906. This shows that a decrease in breeding cows occurred there during that period. So also those counts of cows on East rookery have shown a steady diminution. If, therefore, the estimate of the average harem on St. George had been based upon counts of North and Zapadni or North, Zapadni, and East, it is certain that a different result would have been obtained.

For the last three years, however, it has been the practice to count only Ketovi rookery on St. Paul and North rookery on St. George to obtain an average harem to be used for purposes of estimation. Should we discard this method in 1909 there would be no opportunity to make a comparison between this and preceding years. For comparison, therefore, the pup count of Ketovi on St. Paul and of North on St. George will be used to determine the average harems of both islands to compute the number of breeding cows. The average harems on those rookeries, as already stated, are Ketovi, 34.1; North, 34.7.

It can thus be seen that the average harems on these two rookeries which have been accepted heretofore as typical of all differ but slightly in the size.

NUMBER OF BREEDING COWS.

It was found that there were 1,071 harems on St. Paul and 267 on St. George. Applying the average harems above mentioned to the whole number of harems on the two islands, we have the following as an estimated census of breeding cows:

ESTIMATED NUMBER OF BREEDING COWS, 1909.

Island.	Average harem.	Total harems.	Whole number of breeding cows.
St. Paul	34.1	1,071	36,521
St. George	34.7	267	9,265
Total		1,338	45,786

Contrast with 1908.—Using the rookery of Ketovi as typical of conditions on the whole of St. Paul Island, we may contrast the estimate of cows given above with that made by the same method in 1908.

In that year Ketovi contained 48 harems and 1,960 pups, affording an average harem of 40.8. As 1,062 harems were found on the entire island, the application of the average harem of 40.8 would produce a total of 43,329 breeding cows. On St. George, the typical rookery, North, had 94 harems and 4,123 pups, giving an average harem of 43.8. As there were 241 harems on the entire island, an estimate of the entire number of breeding cows on that island, based upon the average harem obtained as above, would give 10,555. For the two islands, therefore, in 1908, by the methods of estimation outlined above, there was in 1908 a total of 53,884 breeding cows.

Since 45,786 cows were estimated to be present in 1909 and 53,884 in 1908, it would appear that a decrease of 8,098 cows, or 15 per cent, has occurred during the year.

DIFFERENT BASES OF ESTIMATION.

This estimate of breeding cows, as has been stated, is based upon the size of an average harem obtained by counting the pups on only one rookery on each island. It may be granted that had another rookery on either island been selected as typical an entirely different result would have been obtained. This may be seen readily by a scrutiny of the average harems on the various rookeries on St. Paul on which pups were counted in 1909. As it is, the Ketovi rookery average harem of 34.1 represents a fair mean between the highest and the lowest averages obtained by counting other rookeries, and might fairly be taken as typical of the entire island when considering the size of the average harem. The fact that the average harem may be made to vary greatly by the selection of other rookeries is cited, however, to show that the estimate made is open to criticism on the ground of uncertainty as to its accuracy. If, instead of constructing an estimate based upon an average harem and contrasting that estimate with one made in the same manner the previous year, we were to take the percentage of decrease shown by an actual count of pups on certain rookeries, it is believed that a more accurate idea would be obtained as to the changes occurring in the breeding cows.

In observing the decrease in seal life it has appeared that certain rookeries, or rather portions of rookeries, either show a smaller rate of decrease than others or in some instances do not show any decrease at all, while others do. We may take it from this that certain localities are focal points in the breeding areas, attracting the breeding

seals more than others. Around these central points the animals gather instinctively, while those that can not obtain lodgment thereon spread to one side or the other. So, also, when the rookery space occupied retracts by depletion of the herd the spaces on either side of these focal points are first deserted and the herd converges upon the places which seem most desirable as breeding grounds.

Owing to the decrease in the herd during the last few years, opportunity has been offered to ascertain the points more desired by breeding seals. On these places the diminution has been less apparent than at others, or the diminution between particular years has amounted to nothing at all. We have seen that Ketovi rookery for several years has shown scarcely any loss, while portions of other rookeries have been virtually eliminated or reduced to skeletons of their former aspect. Lukanin rookery, for instance, immediately adjacent to Ketovi, has had four-fifths of its breeding area denuded, and such breeding seals as are left gather only on the hill at the southern extremity. Portions of Gorbatch rookery are deserted, leaving such seals as are there at the central portion, approximately, and the extreme west end. Polavina rookeries have retracted until practically all seals are at Polavina Point. Northeast Point rookery has retracted from the ends toward the center. Zapadni rookery has receded toward its central massed areas, leaving the bowlder beach line of Zapadni Reef almost bare of seal life. Ketovi rookery itself has abandoned that portion which abuts Black Bluffs, but after rounding Ketovi Point the breeding seals there seemed to have maintained their numbers with little or no decrease.

Likewise, on St. George Island, North rookery seems to be a favored spot that attracts breeding seals to the exclusion of other rookeries. It has shown little decrease, or rather a more gradual decrease than East rookery and its outlying areas and Zapadni rookery, which seem to have suffered such loss in breeding seals as has occurred on St. George in recent years.

It can be seen, then, that the loss among breeding seals is greater in some areas than others, and that the least decrease has occurred on Ketovi and North rookeries, the ones chosen as typical. Since this is the case it would seem proper that the loss in seal life should be sought where it really occurs and not upon those rookeries that are shown to have remained stable in numbers or on which the rate of decrease is slower than upon others. Consequently, judgment as to the condition of the rookeries in general should be based not upon conditions on one rookery alone and upon that rookery in particular which shows least change. The data upon which it is to be formed should be gathered from other localities as well upon which changes have occurred. Only in this way, in my belief, can a correct idea be formed as to changes in the number of seals present. It would,

of course, involve extended counting and this means unwonted disturbance of the breeding cows. For this reason it should not be done every year. But at intervals of five years, for example, an extended count of pups should be made on each island and from the data thus obtained should be made an estimate of the number of breeding cows in the herd.

Disturbance of the rookeries in itself means no harm, provided it is not constant. No harm to the cows follows directly from the act of their being disturbed and driven off their breeding ground. Harm does come, however, when such driving occurs in connection with the presence of over 100 small boats filled with men armed with shotguns, waiting as close to shore as they may come, ready to shoot the seals that are driven off the rookeries. While such a menace is present ordinary prudence dictates that the seals on shore should not be disturbed unless it is desired to augment the pelagic catch from the breeding cows that represent the very life of the herd.

In the interval between these suggested five-year counts no serious effort need be made to count the seals. Inspection of the area occupied would disclose in a general way whether any radical change in the numbers had occurred and this could be done without disturbance. The Government could well afford to sacrifice some of its minute data regarding seal life to the greater consideration of saving the lives of many breeding cows each year by refraining from driving them within reach of the pelagic fleet.

CONCLUSION AS REGARDS BREEDING COWS.

It may be accepted as a fact that a decrease in breeding cows has occurred since 1908. The retraction of the breeding seals from the places formerly occupied and the actual count of pups on North rookery demonstrate this. The fact that Ketovi rookery on St. Paul does not show a decrease from 1908 must indicate either that the numbers on this particular rookery have been maintained through accessions of cows from other less attractive rookeries, or that pelagic sealing had less effect upon the cows frequenting this rookery than upon others.

From such data as we have on hand at present, which have already been detailed, it will be safe to conclude that the decrease in breeding cows varies between 10 and 15 per cent. It may be safe, furthermore, to estimate that the whole number of breeding cows now embraced in the herd is in the neighborhood of 45,000, varying several thousand on one side or the other because of the necessary amount of conjecture used in making the estimate.

NONRETURN OF COWS AFTER DISTURBANCE.

Upon the occasion of the counting of pups on Lagoon rookery last summer count was made of the cows on that rookery before they were disturbed and driven off by the approach of the pup counters. On that date (August 4) 320 cows were present. Daily, for a week thereafter, this rookery was revisited and the cows recounted, the object being to ascertain whether after being driven off into the water the cows returned to the rookery in anything like the number present before the disturbance.

The series of counts made justifies the conclusion that after having been so disturbed the cows do not return in the same numbers as before the clearing off of the rookery. A list of the counts of cows follows:

August 4	320
August 5	204
August 6	190
August 7	164
August 8	193
August 9	163
August 10	148
August 11	152

This shows that on the day after this rookery was first disturbed 116 cows had failed to return and in all probability had gone to sea. At no time thereafter were there as many cows found on the rookery as when they were first driven off. We must conclude from this that driving off of cows from a rookery increases the number at sea which may be killed by pelagic sealers and that, under present conditions, disturbance of the rookeries in the manner indicated has the effect virtually of increasing the pelagic catch.

CENSUS OF SEAL HERD.

In making a census of seals in the whole herd only the adult stationed bulls are actually counted, together with a small number of pups. By means of the latter an average harem is established, to be used in estimating the number of pups and breeding cows. This, however, has already been explained. All other seals in the herd can be enumerated only by estimation based upon such facts concerning their numbers as we may be able to gather.

ESTIMATE OF HALF BULLS.

Records kept of the dismissal of large seals from the killing grounds show that 1,770 large young males were turned away on both islands. Observations made heretofore by me, based upon the percentage of return of 3-year-old males, suggest strongly that not more than 50 per cent of the half bulls appeared upon the hauling grounds, the

other half hanging about the rookeries worrying the cows. This indicates that the number of half bulls appearing in the drives should be doubled in endeavoring to arrive at the whole number. If we double those seen in the drives in 1909 we would have 3,550 as an estimate of the young males in the herd too young to hold positions on the breeding rookeries, but too old to be killed for skins.

ESTIMATE OF YOUNG SEALS.

In 1907 the census of seals gave the number of new-born pups as 50,825. Of these one half were males and the other half females. These pups of 1907 would be 2-year-olds in 1909.

By the usual process of estimation the 25,000 male pups in 1907 would return to the islands in 1909 to the number of 10,165. Approximately 8,000 of these were killed by the lessee in 1909, leaving 2,165 surviving at the close of the season.

The female 2-year-olds by this process would number 10,165 in 1909.

The yearlings in 1909 would number approximately 12,000, divided equally between the sexes.

Of the 3-year-old bachelors, 1,000 were reserved for breeding in 1909. In addition to these some few escaped driving. A fair estimate of the number of this class would be 1,200.

STATISTICS OF SEAL LIFE IN 1909.

From the foregoing we may construct the following census of seal life at the close of the sealing season of 1909:

Bulls, active with harems	1,132
Bulls, idle and quitters	256
Half bulls	3,550
3-year-old bachelors	1,200
2-year-old bachelors	2,165
Yearling bachelors	12,000
Male pups	22,882
Breeding cows	45,765
2-year-old cows	10,165
Yearling cows	12,000
Female pups	22,882
Total	133,997

This total is an approximation, based upon such limited knowledge of the numbers of the seal herd as we possess. There are certain classes of seals which it is highly impracticable to count accurately, as, for instance, the entire body of the new-born pups. There are other classes impossible to count, as the yearlings, half bulls, and adult cows, some of which are always in the water. These facts all

result in forcing the enumerator of the seal herd to resort to estimation in arriving at their numbers.

The result of experience has been to show that previous censuses made in the manner adopted in 1909 have been inexact in showing fewer seals than actually were in existence. This probably will be the case with the census of 1909. It is altogether probable that the estimates of the bachelors made by me in 1909 are too low, due to the allowance of a higher death rate than actually occurs among them.

DEAD PUPS.

In October, 1908, and again in 1909, counts were made of dead pups on the various rookeries on St. Paul Island. These counts were made in some instances by myself or assistant agents and in others by intelligent natives detailed by me. The count follows:

DEAD PUPS, ST. PAUL ISLAND.

	1908.	1909.	
		Dead.	Starving.
Lagoon	4	15	
Tolstoi Cliffs	152	104	6
Tolstoi	287	440	14
Ketovi	36	77	2
Amphitheater	17	10	
Lukanin	77	117	8
Gorbatch Cliffs	1	10	1
Gorbatch	245	319	12
Ardiguen	24	33	2
Reef	701	881	24
Zapadni Reef	4	17	
Little Zapadni	183	270	6
Zapadni	369	426	18
Polavina	45	131	7
Polavina Cliffs		52	2
Little Polavina	4	36	
Northeast Point	854	722	17
Sea Lion Rock		126	6
Total	3,003	3,786	125

In 1908, with approximately 50,000 births, 3,000 dead pups were found in October of that year on St. Paul alone. What the death rate was on St. George is impossible to determine, as foxes eat the dead pups' bodies immediately after death. Furthermore, the bodies of such pups as die early in the season have, by October, almost entirely disintegrated, and can not be seen when counting is done late in the fall. In 1909, with a diminished herd of cows, more dead pups were counted than in 1908. We must believe that mortality among pups was greater in 1909 than in 1908, caused, undoubtedly, by increased pelagic sealing, and that such mortality while the pups are on land is in the neighborhood of 10 per cent.

On August 12 the dead pups on Tolstoi sand flat were counted, with a view of finding uncinariated pups. All seals on the flat

were driven off. We found thereon 271 dead pups. Of these, 151 of the freshly dead plainly were starved. Of the remainder, the most were so rotten that, not only could no dissection be made, but it was impossible to tell in any way the cause of death. Of those freshly dead, 7 autopsies were made. Three of these plainly indicated starvation, the autopsies being made merely to verify that fact. Two dead pups were found with an abundance of subcutaneous fat and with stomachs full of milk. The flesh was anemic and pale. Areas of inflammation were found in the small intestines of each. These areas were dissected, but no worms were found there. In the appendix of one of these pups, however, and in the small intestine several inches from the appendix, a number of worms from one-half to 1 inch in length and of the thickness of a thin hair was found. These were preserved, together with the entire small intestine, for further study. Portions of the intestines of all pups dissected were preserved. One pup was found which, although emaciated in appearance, was found to have a small layer of subcutaneous fat. The feces in this case were dark but not tarry in the large intestine. Another dead pup was found with pale excrescent kidneys of very irregular form. Mr. Chichester believed the evidence in this case to point to fatty degeneration. The bowels and other organs of this animal were normal.

All specimens of intestines and worms found upon this occasion were forwarded to the Bureau of Fisheries, but as yet no microscopic examination of them has been made.

As the result of the examination of the Tolstoi sand flat, it was found that over half the dead pups plainly had died of starvation; that of the remainder, which included all the wholly rotten pups, only a few were found whose death could be ascribed to uncinaria. Whatever may have been the death rate from uncinaria in previous years, it is certain that its effect at the present time is almost nothing.

EFFECT OF PELAGIC CATCH UPON LAND CATCH.

The effect of the pelagic catch is supposed to be felt directly by the breeding herd. Pelagic catches are supposed to consist mainly of breeding females. If the pelagic catch is heavy fewer females are supposed to appear on the islands; if light, more females will be present. If more females appear, the births will be increased and more bachelors be present two years later as 2-year-olds. As the lessee's catch, except for the years 1904–1908, has been composed mainly of 2-year-olds, it would be supposed that the effect of a heavy sea catch would be felt two years later in a decreased catch of bachelors on land.

An examination of the land and pelagic catches for a series of years, however, fails to show such a close connection between the land and sea catches as would be supposed. The following table contains the pelagic and land catches from 1900 to date:

PELAGIC AND LAND CATCHES OF SEALS, 1900 TO 1909, INCLUSIVE.

Year.	Pelagic catch.	Land. catch.	Year.	Pelagic catch.	Land catch.
1900	35,191	22,470	1905	25,320	14,368
1901	24,050	22,672	1906	21,236	14,476
1902	22,812	22,386	1907	16,036	14,964
1903	27,000	19,292	1908	18,151	14,996
1904	29,006	13,128	1909	.....	14,336

It can be seen from this table that a heavy pelagic catch (35,191) occurred in 1900, yet the land catch of 1902 was within a hundred of what it was in 1900. We find a heavy pelagic catch in 1903 (27,000), yet the land catch of 1905 seems not to have decreased to any appreciable extent when we consider the restrictions upon land killing in that year and the number of bachelors released for breeding. The pelagic catch of 1904 increased to 29,000, and we have found a decrease in the number of bachelors present in 1906, although this might have been merely a coincidence. We find in 1905 still a large pelagic catch (25,320), but we have already stated that the number of bachelors present in 1907 was greater than the preceding year. In 1907, on the other hand, we had a small pelagic catch (16,000), but, notwithstanding this, the number of bachelors in 1909 was smaller than ever before, when, according to theory, there should have been more bachelors present than formerly.

The effect of pelagic sealing is cumulative and twofold; it diminishes not only the number of 2-year-old seals appearing two years thereafter, but also the number of seals in general appearing during the year itself. Those females killed in the spring off the northwest coast of course do not reach the rookeries, thereby decreasing the number of breeding seals in that year. This means a decreased number of pups born and of 2-year-old seals appearing two years later, but the effect is felt also in the year in which the pelagic catch is made.

For this reason it is hard to attribute a decrease in bachelor or other seals occurring in any year specifically to the pelagic killing of any former year. Should the pelagic catches be greater the herd will decrease; if they become less the herd will remain stationary or will increase, but it is not possible, in the light of present knowledge, to trace a reduction in bachelors exactly to the pelagic catch of any one year, although the effect must be felt sooner or later.

FOXES.

ST. GEORGE ISLAND.[a]

In point of numbers the fox catch this year was extremely unsatisfactory, being smaller than at any time since 1904–5. There can be little doubt, however, that this falling off was due not to any diminution of the herd but to the peculiar conditions of the weather. There was practically no snow on the ground up to February 1, while during the latter part of November, the whole of December, and the greater part of January, the entire trapping season, in short, rain fell constantly, the beaches were open, and vast congregations of sea quail, sometimes acres in extent, covered the sea in close proximity to the land. Numbers of these birds seemed to be suffering from some distemper, which rendered them helpless, and they were cast ashore, attracting the foxes to the beach instead of to the traps for food. It was only by constant trapping that the catch was saved from utter failure.

Trapping was begun November 19, at 4 o'clock in the afternoon, and by 8 o'clock that night 234 foxes had been captured in the three traps, the largest catch handled in one night since the present method of trapping was established. Only one more large catch, of 74, was secured, however, the remainder of the total being secured in small lots. Early in February the foxes began to change color and lose their fur in spots, and on February 12 so marked had these changes become that trapping was discontinued.

During the sealing season of 1908 all the carcasses of seals killed and not consumed by the natives were salted down for fox food, the company providing the necessary salt for the purpose. The company also furnished, as required by contract, 12 tons of salted fish. In addition to this there was a large amount of salt fish on hand from previous years. This, however, was not used, nor indeed was all that was supplied this season.

The feeding of salt cod was begun October 5 and continued until November 17, when seal meat was added. During the month of October but little of the food put out was eaten. The foxes for some unknown reason do not take kindly to salted cod. This was remedied somewhat, however, by soaking a number of seal carcasses in each batch of cod, which treatment seemed to give a piquancy to the cod and render it more acceptable to the foxes. From December 28 to January 21, however, but a small fraction of the seal meat fed was eaten, and there were but very few days during the entire winter that the quantity of food put out was not in excess of that consumed.

[a] The report on the foxes of St. George Island was prepared by Mr. H. D. Chichester, assistant agent in charge of that island during the season of 1908–9.

The supply of seal meat at the village became exhausted April 9, 1909, but the feeding of cod continued daily until May 1, at which time the birds arrived in such numbers as to render further feeding unnecessary. The total amount of food known to have been consumed by the foxes is as follows:

	Pounds.
Salt cod	4,146
1,030 salt seal carcasses	25,750
Offal of 400 seals	4,500
Total	34,396

The total catch for the season was 779 blue and 10 white foxes. From these were selected for breeding purposes 198 blue males and 223 blue females, leaving 230 blue males, 137 blue females, 4 white males, and 6 white females to be killed. The foxes selected for breeding were, without exception, the finest lot that have thus far come under my notice. No male weighing less than 10 pounds was saved, and no female of less than 7½ pounds. Most of the males weighed 11 pounds or over, and by far the larger number of females tipped the scales at 8 pounds or over. No lame, blind, old, or decidedly off-color foxes were preserved. In fact, so rigid was this selection that the end of the season found the number saved for breeders considerably less than usual. This, however, seems to be of small moment, as the number of foxes that did not pass through the traps at all is this year unusually large. A dozen foxes have been counted about the village, half of which were not branded, and this seems to be about the ratio of branded to unbranded met with at various points about the island.

But two dead foxes were found during the entire year. Autopsy failed to show cause of death. About a dozen mangy foxes were observed. All of those that were caught were destroyed, and the rest unquestionably perished during the severe weather that prevailed in March and April. A fox denuded of its fur would have little chance to survive the terrible blizzards and cold of these months.

Of the 367 blue and 10 white skins taken this year the company accepted 357 blue and 10 white. Eight blue were rejected, and 2 mangy skins that were absolutely worthless were destroyed. In payment for the skins accepted ($5 for each blue and $1 for each white) the sum of $1,795 has been credited on the company's books in favor of the native inhabitants of the islands and is available for their support.

ST. PAUL ISLAND.

While a slight increase in the number of foxes on St. Paul was noted, there were not enough present to justify trapping, although the natives were anxious to get some skins and spend the cash for firearms. The increase in foxes on this island since the epidemic

of 1903 has been very slow. The fox herd here probably never will reach its former size unless such foxes as are on the island can be trained to gather at certain localities where they may be fed. Heretofore, although attempts have been made, some more or less elaborate, it was not possible to induce foxes on St. Paul to eat food thrown out for them. This being the case, they could not be gathered into herds or bodies, without which systematic feeding or trapping could not be accomplished. Last year, however, for some unexplained reason, a number of foxes gathered about the village and readily ate salt salmon freshened in pure water and thrown out to them.

On February 19 it was noted that whereas a lone fox had been acting as scavenger about the village during the winter, on that date five were seen. Thereafter more than one fox could be seen constantly. In March, owing to the presence of drift ice and zero weather, it was believed to be good policy to offer food to these foxes, and accordingly some salt salmon having been obtained, about March 25 (the exact date was not noted) some of it was freshened and thrown out. This disappeared, but rather slowly. On March 29 a second feeding was thrown out, consisting of six salmon. This was eaten. Previous to this date the quantity of food consumed each night had not been noted, but thereafter attention was paid to it. Salmon, sea-lion meat, and hog offal were supplied in varying quantities until May 17, and were each time all or partially consumed. At the latter date feeding was discontinued, as birds were in abundance and the weather mild. Foxes increased in numbers about the village after feeding was begun. As many as 15 were seen at one time on the flat where the food was distributed. This is the first time these animals could be induced to congregate about the village and accept food. Perhaps the fact that the salmon was soaked in pure water instead of in sea water, as in previous attempts, made a difference.

Further attempts will be made this winter to congregate the foxes by feeding. During the sealing season some seal carcasses were buried to be used for fox food in winter.

ADMINISTRATION OF LAWS.

PELAGIC SEALING.

The subject of pelagic sealing has been treated at such length by investigators in the past that it is needless here to reiterate statements showing its deadly effect upon the seal herd. The laws of the United States in the matter have been published in Bureau of Fisheries Document 732.

Sealing fleet and catch.—The pelagic fleet about the seal islands in 1909 was composed of 23 Japanese and 5 Canadian schooners. Of

these, 20 Japanese were boarded by our Revenue-Cutter Service on patrol and 3 additional by H. M. S. *Algerine*, assigned to the patrol by the British Government. The catch of the Japanese up to August 17, as reported to the boarding officers, was 6,610. It is believed that their total catch for the season will approximate 10,000 and be equal at least to that of 1908.

None of the five Canadian schooners which were granted licenses for sealing in 1909 were boarded by the patrol vessels after August 1, and it is believed that their operations were conducted far off the Pribilof Islands. Those that were boarded were in the neighborhood of the Semidis on June 23, when their masters stated their intention to visit the Commander Islands and later to seal in Bering Sea. As stated before, none were afterwards seen sealing by the patrol, although the *Thomas F. Bayard* put into Unalaska harbor on August 17, and her master stated his intention to seal thereafter about 200 miles north and east of the Pribilofs.

Authentic reports of the pelagic catch of 1909 are meager. No report from Japanese officials showing the 1909 catch of vessels flying that flag has been received. The United States consul at Victoria, in a telegram of November 10, last, informed the State Department that the official figures of the Canadian catch for 1909, complete, are as follows: British Columbia, coast, 1,493; outside area, 623; Bering Sea, 1,439; Indian catch, 187; total, 3,742.

To this must be added a coast catch by Indians on the coast of the United States of 411, so far as now known.

Seizures of sealing vessels.—On July 9 the revenue cutter *Perry* seized the Japanese schooner *Tenyu Maru*, having captured one of her boats within the 3-mile limit, in which boat was the body of a fur seal recently shot. The schooner was taken to Unalaska and after a preliminary hearing before the United States commissioner at that place the master and crew, 17 men in all, were bound over to the grand jury at Valdez for trial at the October session of the United States district court. They were transported to Valdez on the cutter *Perry* and given over to the United States marshal at that place on September 4 to await the action of the grand jury. The schooner was held at Unalaska.

On September 2, at Walrus Island, about 7 miles from Northeast Point, two Japanese rowboats from the schooner *Eun Maru*, containing six Japanese seamen, one fur seal, and complete sealing outfits, were seized by assistant agent Judge and natives for sealing within the 3-mile limit. These six Japanese were delivered to the revenue cutter *Bear*, which took them to Unalaska. They were tried there before the United States commissioner and each sentenced to three months in jail and a fine of $200 and costs. A failure to pay the fine and costs will extend the jail sentence to more than six

months. The prisoners, after sentence, were sent, on September 30, on the revenue cutter *Rush*, to Valdez, where their sentences will be served.

At the time of the capture the facts were at once reported to the captain commanding the cutter *Bear*, with a request that search be made for the schooner to which the boats belonged, and the apprehension of her, if found. Although both the cutters *Bear* and *Manning* afterward made such search, nothing thereafter was seen of the schooner, which clearly was liable to seizure.

Numerous instances were reported by the native guards stationed on the rookeries of the approach of small sealing boats close to shore, during the temporary absence of the patrolling cutters. On several occasions, during thick fog, the noise of the sealers' gun fire could be heard at the village plainly and almost incessantly for several days at a period. Because of the fog it was not possible to determine how close to shore the sealers were, but it is believed that they were within the 3-mile limit. On another occasion, while island boats manned by natives were fishing off St. Paul, they were surrounded in the fog by boats of the sealing fleet, the occupants of which were engaged in shooting at seals. The natives on this occasion had some difficulty in avoiding being shot by chance buckshot which were flying in all directions about them.

Locality of operation.—The sealing fleet, as heretofore, centered at St. Paul Island, to the virtual exclusion of St. George Island. Unlike last year, however, the main body of the fleet operated to the southwestward of the island, whereas in 1908 the main body of the fleet hung off Northeast Point, with only a smaller portion off Southwest Point. Several schooners remained at anchor for some weeks between St. Paul and St. George islands.

While the usual practice was for small boats to leave their vessels in the morning and to cruise all day in more or less haphazard fashion, it was noted that the crews of several adopted a much more systematic course. Their method was to ascertain the location of the 3-mile limit by bearings and to distribute themselves along this line with regular intervals between their boats. Maintaining these positions as nearly as possible, they waited for the seals to pass them while going to and from the islands. They carefully avoided entering the 3-mile limit, but they were equally careful to lie as close to it as permissible, depending upon the transit of the seals through their line for victims rather than upon their own efforts to move about in search of the seals. As seals constantly are going back and forth to and from the rookeries, it is obvious that all will be obliged to pass over the line representing the 3-mile limit. Notable among the schooners observing this method was the *Toyai Maru 2*, the crew of which in 1906 landed upon Northeast Point rookery and killed about

200 female seals. This schooner employs white hunters and uses the Japanese only for boat pullers. As the result of using only white hunters, this one vessel alone secured over 1,000 sealskins last summer.

Revenue-cutter patrol.—The patrol furnished by the revenue cutters was never before so thorough and effective as last summer. Rarely, if ever, was either island left without protection. One vessel was stationed constantly at St. George and at least one and usually two about St. Paul. The two cutters at St. Paul divided the coast line between them and each made daily cruises over its territory. In addition, one made its station at Northeast Point while the other made its base at the village, thus covering both extremes of the island. Under these conditions it was difficult for poachers to come inside the 3-mile limit except in thick fog when their movements could not be observed, and when, in fact, it is my judgment, they did enter on several occasions.

The cutters also regularly conveyed mail to and from the islands, and such island passengers as had occasion to go. I visited St. George Island on business twice during the summer, through the courtesy of the captains of the *Manning* and *Rush*, respectively.

Shore guard unnecessary.—The effective patrol maintained this summer demonstrates the lack of necessity of having a shore guard of marines in addition to that native guard already maintained by the agents. The undesirability of such guard could be demonstrated as readily.

The proposition to station sailors ashore to act as guards to prevent violations of our laws carries with it the proposition to abandon the effective patrol by the cutters heretofore maintained and to relieve these cutters of the necessity of constant cruising or, in fact, of anchoring at the islands except occasionally. Dependence would be had thereafter for enforcement of our laws mainly upon the shore guard and not upon the patrol about the islands by the cutters themselves.

To anyone familiar with the situation it is apparent that the protection of the seal islands embraces two elements, namely, first, the protection of the rookeries themselves from actual invasion, and, second, the maintenance of the integrity of our 3-mile limit. With only a shore guard stationed upon land, it is obvious that the 3-mile limit would be without protection, as the shore guard would not be upon the water, nor could it, on the treacherous shores of the seal islands, find landings when it desired to put off and apprehend marauders.

The shore-guard proposition, therefore, would amount virtually to an abandonment of the protection of our 3-mile limit and would place the situation in about the same status as it was in 1906, when

poachers could operate without interference within the limit and approach our shores at will. This situation would make a poacher of every sealer in the Japanese fleet; it would invite raids upon the rookeries themselves, and, however unsuccessful the latter might be, would provide such a source of friction between the two Governments as would constitute an ever-present menace to the stability of the good feeling now existing between them.

It would be better policy, in my opinion, to continue the expense and trouble of the maintenance of the present effective patrol than to leave the islands without protection, except on land, where summary punishment for raids could be administered. To prevent crime is better than to punish it after its commission. The present patrol now prevents invasion of our territory. To abandon this patrol and to substitute only a shore guard in its place is to remove this element of prevention and to invite violations of our laws in the hope that we might afterwards apprehend and punish the offenders.

The present shore guard of natives uses great caution in moving about the rookeries to avoid disturbing the timid bachelor seals, from which the take of skins is secured. A shore guard of marines on the rookeries, unacquainted with the habits of the seals, and unable to distinguish bachelors from breeding cows, would create and maintain such confusion on the rookeries as would seriously interfere with the securing of the normal yield of skins.

Furthermore, the presence of such a guard in the villages creates difficulties of an administrative nature which should be avoided. On the other hand, to station such a guard at or near the rookeries would occasion a constant disturbance of seal life which would be equally objectionable. I recommend that a shore guard on the islands be not permitted.

AFFAIRS OF THE NATIVES.

Census of inhabitants.—A census of the islands for the year ended June 30, 1909, showed a total native population of 280. The individuals and groups composing this total may be classified as follows:

NATIVE INHABITANTS OF THE PRIBILOF ISLANDS, YEAR ENDING JUNE 30, 1909.

Class.	Number.		Class.	Number.	
	St. Paul.	St. George.		St. Paul.	St. George.
Families	41	22	Deaths	5	5
Males	100	43	Net increase	16	.....
Females	93	44	Net decrease	.....	1
Arrivals	5	.....	Total population	193	87
Births	16	4			

Schools.—As required by its lease, the North American Commercial Company maintained on each island a school for children of the natives. The school year covered the period from September 1 to May 1, with five days of attendance each week, usual holidays excepted. On St. Paul Island the enrollment was 43; on St. George 21. Only the English language was taught, with the usual common-school elementary subjects. Except during the early part of the year, when an epidemic of mumps prevailed, the pupils were regular in attendance and made good progress.

Public health.—The general health on the islands during the year was good. An epidemic of mumps went through both islands during the fall of 1908, affecting nearly all the inhabitants, but without complications or serious effect. During the winter infants on both islands were attacked by impetigo contagioso, while the St. Paul population, including all the whites, were annoyed by scabies, or itch. This unpleasant disorder, the eradication of which requires rather heroic measures, still affects some of the St. Paul natives, who can not be prevailed upon to take the necessary arduous steps to stamp out the pest.

Earnings.—The natives on St. Paul realized during the sealing season ended July 31, 1909, $8,386.50 from the taking of 11,054 fur-seal skins, at 75 cents each, and 48 sea-lion skins, at $2 each. The St. George natives, during the same period, earned $2,485.50 from the taking of 3,314 fur-seal skins, at $2 each, and $1,795 from 357 blue-fox skins, at $5 each, and 10 white-fox skins, at $1 each. These sums, in conjunction with the appropriation of $19,500, make a total of $32,167 available for natives' support during the fiscal year ending June 30, 1910.

The amount was allotted between the two islands as follows:

285 tons coal for both islands, at $20 per ton	$5,700
St. Paul Island, 41 families	18,467
St. George Island, 19 families	8,000
Total	32,167

In the above allotment was included an allowance of $650 for the purchase of potatoes and onions for the population of St. Paul. A similar allowance was not made for St. George, as the potatoes and onions necessary for that island were paid for from a small balance of funds unexpended from the previous year.

In making the above allotment, the government appropriation was apportioned as follows:

Coal for both islands	$5,700.00
St. Paul Island, natives' support	10,080.50
St. George Island, natives' support	3,719.50
Total	19,500.00

This arrangement, after payment of fixed charges, such as coal, potatoes, and onions, etc., represents a yearly per capita allotment for the 193 individuals on St. Paul of $91.81 and for the 87 inhabitants on St. George of $91.95.

I have to report that the lessee faithfully performed all the obligations of its contract, paying especial attention to those portions thereof having reference to the care and welfare of the natives.

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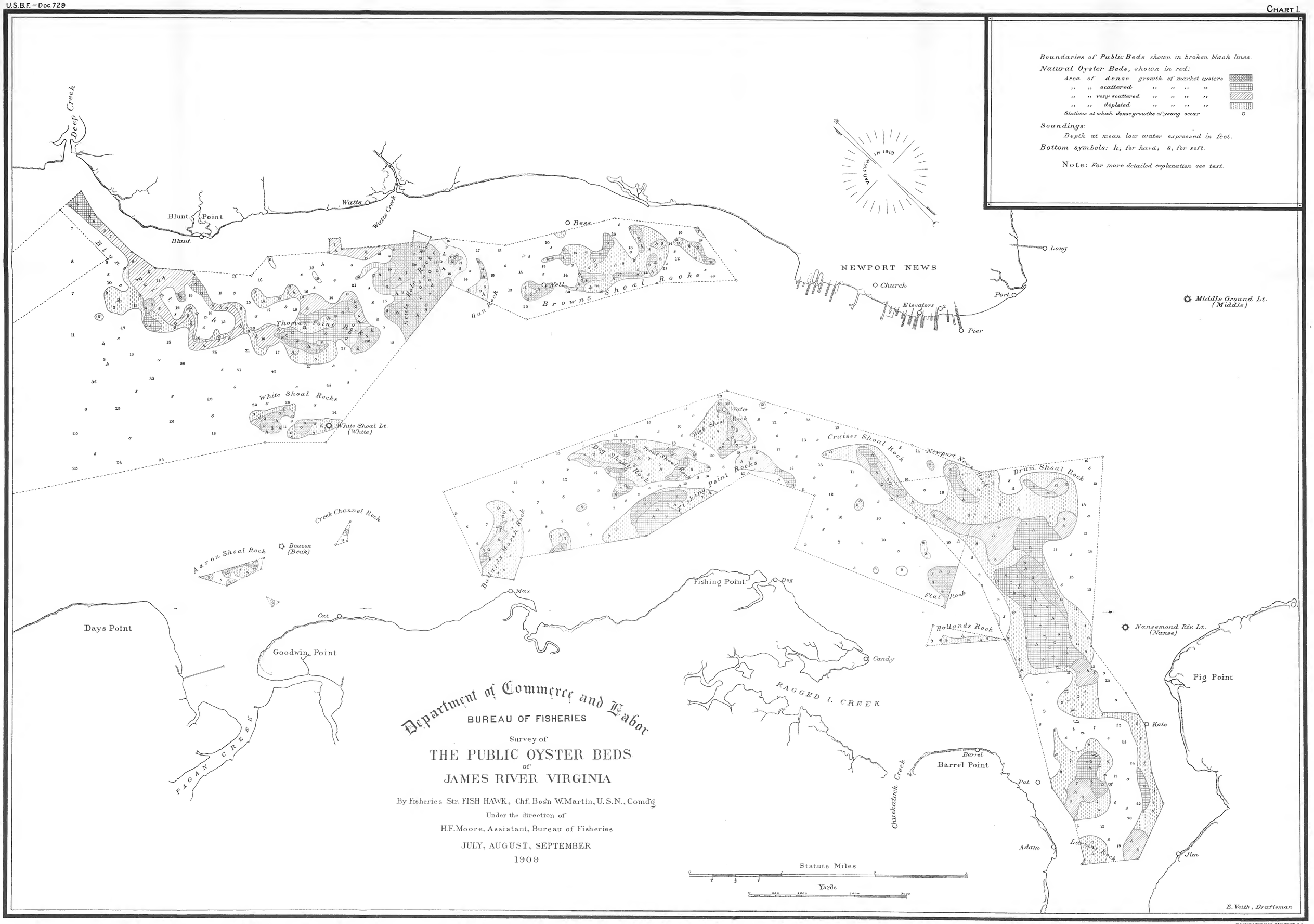


Department of Commerce and Labor

BUREAU OF FISHERIES

Survey of

THE PUBLIC OYSTER BEDS

of

JAMES RIVER VIRGINIA

By Fisheries Str. FISH HAWK, Chf. Bos'n W. Martin, U.S.N., Comd'g

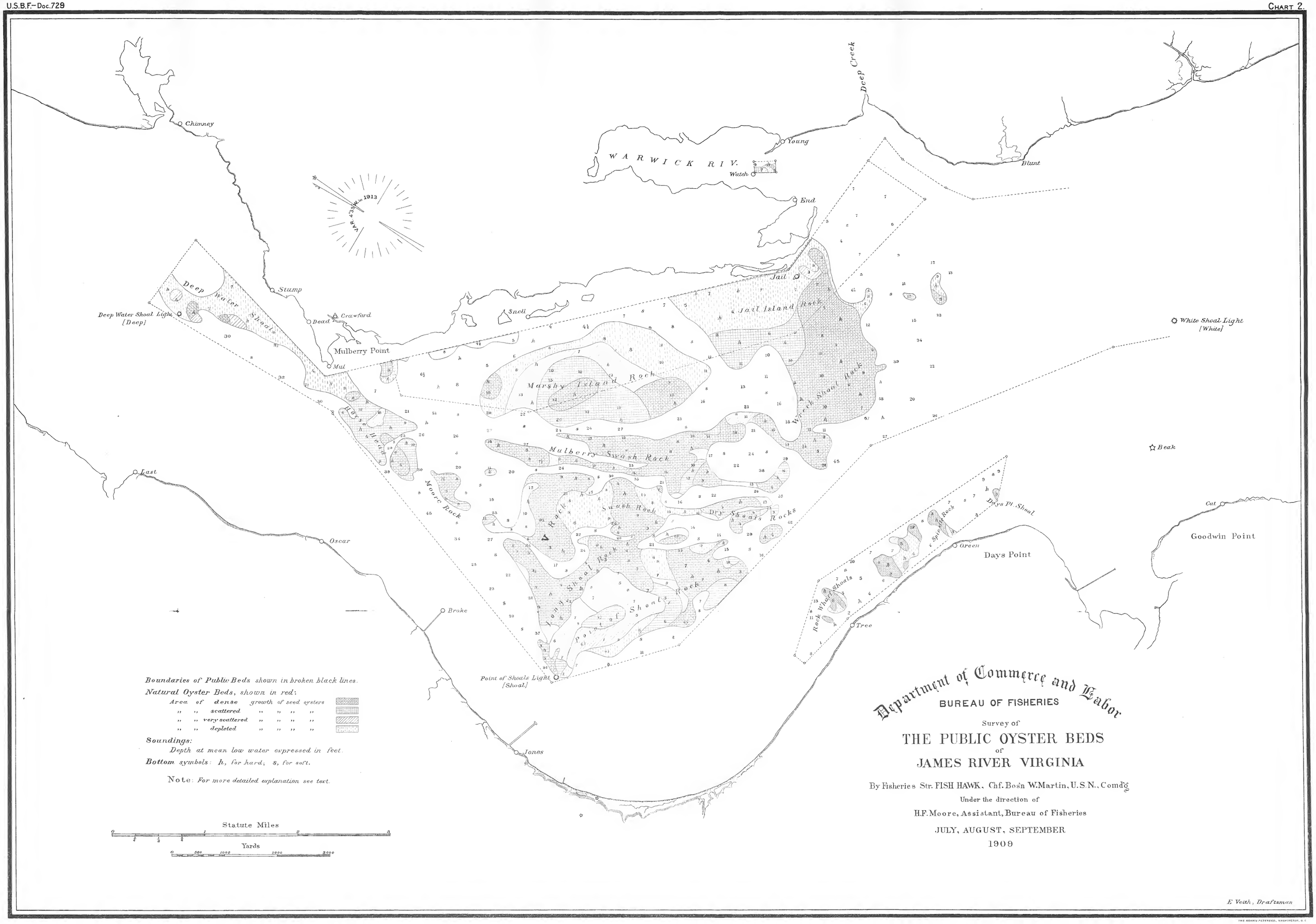
Under the direction of

H.F. Moore, Assistant, Bureau of Fisheries

JULY, AUGUST, SEPTEMBER

1909

THE NORRIS PETERS CO., WASHINGTON, D.C.


Chimney
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Moore Rock
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Oscar
Broke
Jones
Point of Shoals Light [Shoal]
Snell
Marshy Island Rock
Mulberry Swash Rock
Swash Rock
Long Shoal Rock
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Dry Shoals Rocks
Jail Island Rock
Wreck Shoal Rock
Jail
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Watch
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WARWICK RIV.
Deep Creek
Blunt
White Shoal Light [White]
Beak
Cat
Goodwin Point
Days Pt. Shoal
Spindle Rock
Green
Days Point
Rock Wharf Shoals
Tree
VAR. 4°35' W. in 1913
Boundaries of Public Beds shown in broken black lines.
Natural Oyster Beds, shown in red:
Area of dense growth of seed oysters
" " scattered " " " "
" " very scattered " " " "
" " depleted " " " "
Soundings:
Depth at mean low water expressed in feet.
Bottom symbols: h, for hard; s, for soft.
Note: For more detailed explanation see text.
Statute Miles
Yards
Department of Commerce and Labor
BUREAU OF FISHERIES
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E. Veith, Draftsman

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